United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
University of Florida,
Institute of Food and
Agricultural Sciences,
Agricultural Experiment
Stations, and Soil
Science Department;
and Florida Department
of Agriculture and
Consumer Services

Soil Survey of Nassau County, Florida

How To Use This Soil Survey

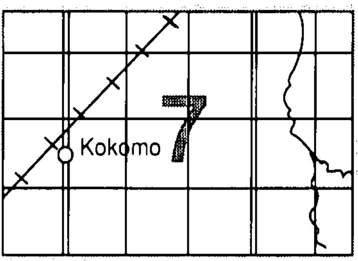
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

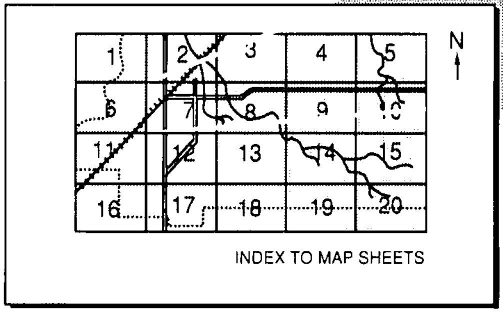
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



MAP SHEET

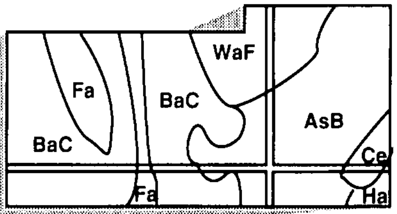
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.

MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1987. Soil names and descriptions were approved in 1987. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1987. This soil survey was made cooperatively by the Soil Conservation Service; the University of Florida, Institute of Food and Agricultural Sciences, Agricultural Experiment Stations, and Soil Science Department; and the Florida Department of Agriculture and Consumer Services. The survey is part of the technical assistance furnished to the Nassau County Soil and Water Conservation District. The Nassau County Board of County Commissioners contributed financially to the acceleration of the survey. Additional assistance was provided by the Florida Department of Transportation.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: This scenic river is a valuable natural resource in Nassau County. The Kingsland and Maurepas soils along the river are used for wildlife refuge.

Contents

Index to map units iv
Summary of tables v
Foreword vii
General nature of the county 1
How this survey was made 6
  Map unit composition 7
  Use of ground-penetrating radar 8
  Confidence limits of soil survey information 8
General soil map units 9
Detailed soil map units 19
Use and management of the soils 77
  Crops and pasture 77
  Woodland management and productivity 79
  Windbreaks and environmental plantings 82
  Recreation 82
  Wildlife habitat 83
  Coastal dune management 85
  Engineering 85
Soil properties 91
  Engineering index properties 91
  Physical and chemical properties 92
  Water features 93
  Physical, chemical, and mineralogical analyses of selected soils 94
  Engineering index test data 98
Classification of the soils 99
Soil series and their morphology 99
  Albany series 99
  Blanton series 100
  Boulogne series 101
  Brookman series 102
  Buccaneer series 103
  Centenary series 104
  Chaires series 105
  Corolla series 106
  Croatan series 107
  Echaw series 108
  Ellabelle series 109
  Evergreen series 109
  Fripp series 110
  Goldhead series 111
  Hurricane series 111
  Kershaw series 112
  Kingsferry series 113
  Kingsland series 114
  Kureb series 114
  Leefield series 115
  Leon series 116
  Lynn Haven series 117
  Mandarin series 118
  Maurepas series 119
  Meadowbrook series 119
  Meggett series 120
  Newhan series 121
  Ocilla series 122
  Ortega series 122
  Osier series 123
  Ousley series 124
  Penney series 125
  Pottsburg series 125
  Resota series 126
  Ridgewood series 127
  Rutlege series 128
  Sapelo series 128
  Tisonia series 129
  Wesconnett series 130
Formation of the soils 131
  Factors of soil formation 131
  Processes of horizon differentiation 133
References 135
Glossary 137
Tables 145

Issued March 1991

Index to Map Units

2—Arents, nearly level 19
3—Beaches 20
4—Echaw fine sand 20
5—Fripp fine sand, rolling 21
6—Hurricane-Pottsburg fine sands, 0 to 5 percent slopes 22
7—Kingsland mucky peat, frequently flooded 24
8—Kureb fine sand, 0 to 5 percent slopes 24
9—Leon fine sand 26
10—Mandarin fine sand 27
11—Chaires fine sand 28
12—Newhan-Corolla, rarely flooded, fine sands, rolling 30
13—Goldhead fine sand 31
14—Rutlege mucky fine sand, frequently flooded 33
15—Buccaneer clay, frequently flooded 35
16—Ellabelle mucky fine sand, frequently flooded ... 35
17—Urban land 36
18—Lynn Haven-Wesconnett-Leon complex, depressional 36
19—Leon fine sand, tidal 37
20—Ortega fine sand, 0 to 5 percent slopes 37
21—Blanton fine sand, 0 to 5 percent slopes 39
22—Sapelo-Leon fine sands 40
23—Ocilla fine sand, 0 to 5 percent slopes 42
24—Kingsferry fine sand 43
25—Maurepas muck, frequently flooded 44
26—Centenary fine sand, 0 to 5 percent slopes 46
27—Ridgewood fine sand, 0 to 5 percent slopes 47
28—Tisonia mucky peat, frequently flooded 49
29—Resota fine sand, 0 to 5 percent slopes 49
30—Kureb-Resota fine sands, rolling 50
31—Kershaw fine sand, 2 to 8 percent slopes 51
32—Aqualfs, loamy 53
33—Goldhead-Meadowbrook fine sands, depressional 53
34—Croatan muck, frequently flooded 54
36—Boulogne fine sand 54
37—Meggett loamy fine sand 56
38—Meggett fine sandy loam, rarely flooded 57
39—Evergreen-Leon mucks, depressional 59
40—Brookman mucky fine sandy loam, depressional 59
44—Corolla fine sand, 2 to 6 percent slopes, rarely flooded 60
45—Meggett loamy fine sand, depressional 61
46—Buccaneer clay, rarely flooded 61
47—Leefield fine sand, 0 to 5 percent slopes 62
49—Ousley and Mandarin fine sands, occasionally flooded 63
50—Blanton fine sand, 12 to 20 percent slopes 65
51—Albany fine sand, 0 to 5 percent slopes 66
52—Osier loamy fine sand, frequently flooded 67
53—Meadowbrook fine sand 68
54—Sapelo fine sand 69
55—Meadowbrook-Goldhead-Meggett complex, 2 to 5 percent slopes 71
56—Blanton-Ortega fine sands, 5 to 12 percent slopes 72
57—Penney fine sand, 0 to 5 percent slopes 73

Summary of Tables

Temperature and precipitation (table 1) 146

Freeze data (table 2)... 147

Acreage and proportionate extent of the soils (table 3) 148
Acres. Percent.

Land capability classes and yields per acre of crops and pasture (table 4)... 149
Land capability. Corn. Bahiagrass. Grain sorghum. Improved bermudagrass.

Woodland management and productivity (table 5).......................... 152
Ordination symbol. Management concerns. Potential productivity. Trees to plant.

Recreational development (table 6)..................................... 157
Camp areas. Picnic areas. Playgrounds. Paths and trails. Golf fairways.

Wildlife habitat (table 7) 162
Potential for habitat elements. Potential as habitat for—Openland wildlife, Woodland wildlife, Wetland wildlife.

Building site development (table 8) 166
Shallow excavations. Dwellings without basements. Dwellings with basements. Small commercial buildings. Local roads and streets. Lawns and landscaping.

Sanitary facilities (table 9) 171
Septic tank absorption fields. Sewage lagoon areas. Trench sanitary landfill. Area sanitary landfill. Daily cover for landfill.

Construction materials (table 10) 176
Roadfill. Sand. Gravel. Topsoil.

Water management (table 11).. 180
Limitations for—Pond reservoir areas; Embankments, dikes, and levees; Aquifer-fed excavated ponds. Features affecting—Drainage, Irrigation, Terraces and diversions, Grassed waterways.

Engineering index properties (table 12) 186
Depth. USDA texture. Classification—Unified, AASHTO. Fragments greater than 3 inches. Percentage passing sieve number—4, 10, 40, 200. Liquid limit. Plasticity index.

Physical and chemical properties of the soils (table 13). 192
Depth. Clay. Moist bulk density. Permeability. Available water capacity. Soil reaction. Salinity. Shrink-swell potential. Erosion factors. Wind erodibility group. Organic matter.

Water features (table 14) 196
Hydrologic group. Flooding. High water table.

Physical analyses of selected soils (table 15). 199
Depth. Horizon. Particle-size distribution. Hydraulic conductivity. Bulk density. Water content.

Chemical analyses of selected soils (table 16) 206
Depth. Horizon. Extractable bases. Extractable acidity. Sum of cations. Base saturation. Organic carbon. Electrical conductivity. pH. Pyrophosphate extractable. Citrate-dithionite extractable.

Clay mineralogy of selected soils (table 17) 213
Depth. Horizon. Clay minerals.

Engineering index test data (table 18) 216
FDOT report number. Classification—AASHTO, Unified. Mechanical analysis. Liquid limit. Plasticity index. Moisture density.

Classification of the soils (table 19). 219
Family or higher taxonomic class.

Foreword

This soil survey contains information that can be used in land-planning programs in Nassau County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

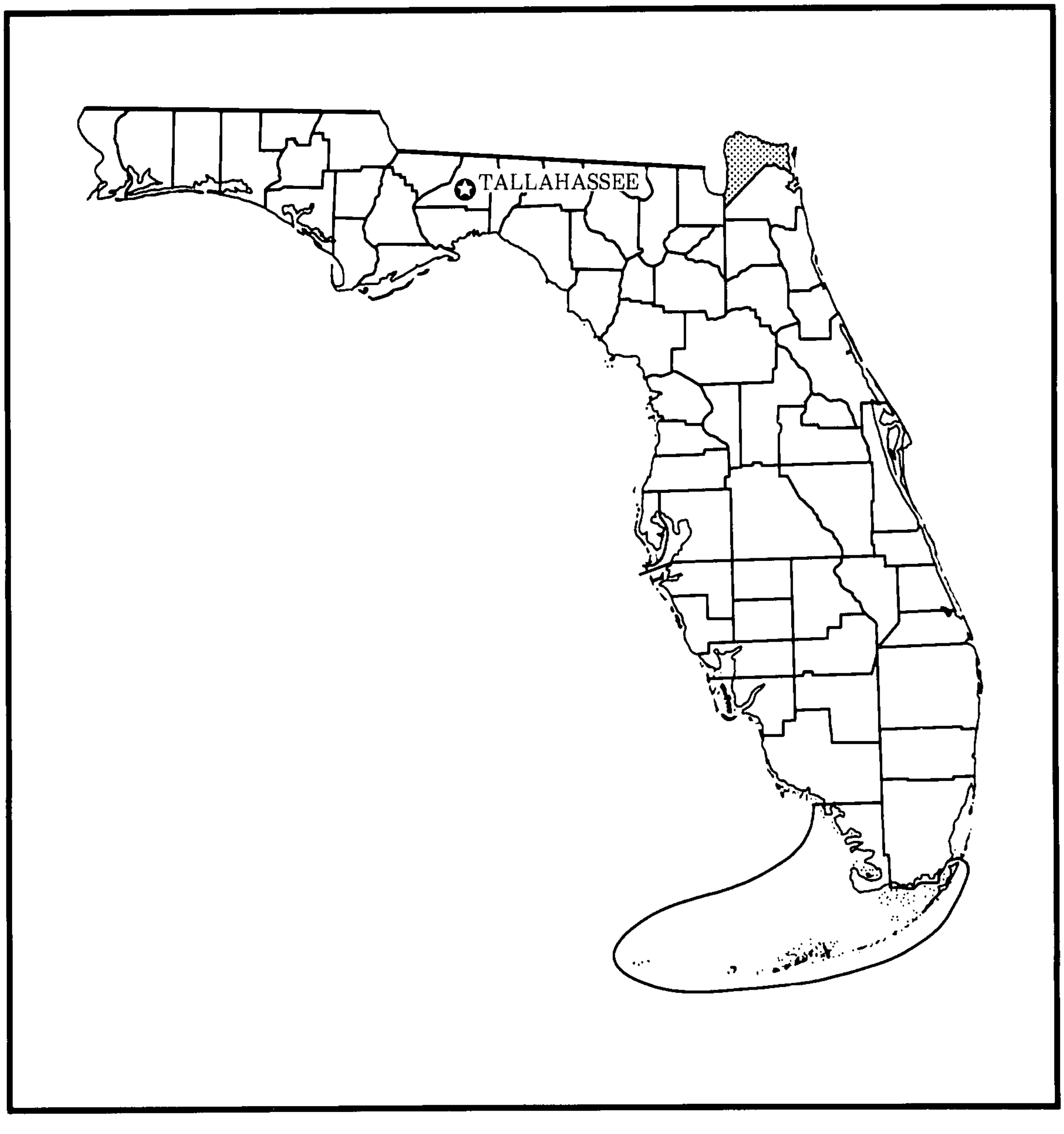
This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Niles Glasgow

T. Niles Glasgow
State Conservationist
Soil Conservation Service


TALLAHASSEE

Location of Nassau County in Florida.

Soil Survey of
Nassau County, Florida

By Frank C. Watts, Soil Conservation Service

Others participating in the fieldwork were J. Andrew Adam, James W. Bell,
Donald O. Clark, David J. Hvizdak, Jeffery A. Lepp, Robert D. Weihrouch,
Bradley A. Wheeler, David L. White, and David E. Wilkinson, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service,
in cooperation with
the University of Florida, Institute of Food and Agricultural Sciences, Agricultural
Experiment Stations, and Soil Science Department; and the Florida Department of
Agriculture and Consumer Services

NASSAU COUNTY is in the extreme northeast corner of Florida. The St. Marys River and the Georgia state line form the entire northern boundary and most of the western boundary of the county. The Atlantic Ocean is to the east, Duval County is to the south, and Baker County is to the southwest. The total area of the county is 428,826 acres, or 649 square miles. Bodies of water that are more than 40 acres in size cover 13,440 acres.

Fernandina Beach, the county seat, is on Amelia Island in the northeast corner of Nassau County. It has a population of about 7,800. The total population of the county is about 39,000.

Forestry and agriculture are the main businesses. The forestry industry is mainly concentrated in the eastern half of the county with two pulp mills on Amelia Island and a paper bag manufacturing company south of Yulee.

General Nature of the County

This section gives general information about the climate; history and development; natural resources; agriculture; transportation facilities; and geomorphology, geology, and hydrogeology in Nassau County.

Climate

The climate in Nassau County is characterized by long, warm, humid summers and mild winters. It is favorable for the production of crops, livestock, and pine trees. The moderating influence of the Atlantic Ocean and the Gulf Stream on maximum temperatures in summer and on minimum temperatures in winter is pronounced along the coast but diminishes noticeably a few miles inland.

Rainfall is heaviest in the summer. About 65 percent of the annual total falls from June through October in an average year. The growing season falls within this period for most crops. The remaining 35 percent is more or less evenly distributed during the rest of the year.

The average maximum temperature shows little day-to-day variation. The temperature can be as high as 96 degrees F for at least 1 day a month during the summer. The minimum temperature in winter varies considerably from day to day, mainly because of periodic invasions of cold, dry air moving southward from across the continent. Table 1 shows summarized climatic data based on records collected at the Jacksonville International Airport *(17, 19)*. The highest recorded temperature during the period 1941 to 1985 was 105 degrees in July 1942, and the lowest temperature was 7 degrees in January 1985.

In many areas, particularly near the water, temperatures seldom drop below freezing. Temperatures fall to freezing or below about 12 times a year. It is rare when the temperature does not rise above 32 degrees during the day; in fact, there have been only five occasions on which it failed to do so *(19)*. Most notable of these was the great freeze of February 13, 1899, when the maximum temperature for the day was only 27 degrees. The freeze data shown in table 2 were taken at the Jacksonville International Airport *(18)*. The average date of the first freeze is December 16 and that of the last is February 6.

Most rainfall in the summer occurs as afternoon or evening showers and thundershowers; sometimes, 2 to 3 inches fall within an hour. Daylong rains in the summer are rare. Generally, they are associated with tropical storms. Rainfall in the fall, winter, and spring is seldom as intense as in the summer. According to the Environmental Data Service at the Jacksonville International Airport Weather Station, rainfall in excess of 8 inches during a 24-hour period can be expected sometime during the year in about 1 year out of 10. Hail falls occasionally during thunderstorms, but hailstones generally are small and seldom cause much damage.

Snowfall is rare in Nassau County. When it does occur, it generally melts as it hits the ground. Since 1871, snow has fallen in the following measurable amounts: 1.9 inches on February 12-13, 1899; 1.5 inches on February 13, 1958; and 0.5 inch on March 1, 1986. On January 10, 1800, 5 inches of snow was recorded at Point Peter, near the mouth of the St. Marys River.

Tropical storms can affect the area from early in June through mid-November. The chance of winds reaching hurricane force, 74 miles per hour or more, in the Jacksonville area is about 1 in 50. The copious rains and the flooding associated with these storms can cause considerable damage.

Extended periods of dry weather can occur in any season but are most common in the spring and fall. Dry periods in April and May generally are shorter than those in the fall but are more serious; temperatures are higher and the need for moisture is greater.

Prevailing winds are generally northeasterly in the fall and winter and southwesterly in the spring and summer. Wind speed, which averages slightly less than 9 miles per hour, is 2 or 3 miles per hour higher in early afternoon. It is slightly higher in the spring than in other seasons of the year.

History and Development

Jan H. Johannes, Sr., author, "Yesterday's Reflections," a history of Nassau County, helped prepare this section.

In June 1521, Francisco Gordilla led the first expedition into the area that would later become Nassau County. He explored from what is now the St. Johns River past the present day Nassau and St. Marys Rivers.

Forty-one years later, Jean Ribault, a French admiral and explorer, recorded the first contact with the Timuquan Indians. He named present-day Amelia Island the "Isle de Mai." In 1567, Pedro Menendez, the Spanish Governor of Florida, built a small fort on the Isle de Mai. Many missions were established to Christianize and educate the Indians.

After years of hostilities between the Spanish and English for control of Florida, Spain ceded all of Florida to England in 1763 in the Treaty of Paris. The treaty of 1783 returned Florida to Spanish control. A land-grant system similar to that used by the Spanish in their earlier occupation of Florida evolved. The platting of the donated land formed the unequal and unusually shaped sections of the county that remain today.

On July 10, 1821, an agreement between the United States and Spain made it possible for Florida to become part of the United States. In 1822, Congress passed legislation making Florida a territory. In the first months of its existence as a territory, the area between the St. Marys and Nassau Rivers, including Amelia Island, was part of Duval County. During one of the first councils, this land was separated from Duval County, and Nassau County was established in 1824. In the United States, only Amelia Island has been under eight different flags—French, Spanish, English, Patriots, Green Cross of Florida, Mexican, Confederate, and United States *(4)*.

Fernandina was first designated as the county seat. In 1835, the county seat was moved to the Sand Hill area east of present-day Evergreen. In about 1862, it was moved to Kings Ridge, about 5 miles north of present-day Callahan. In 1865, the county seat was returned to Fernandina Beach, where it remains.

In 1842, a tract of land on the north end of Amelia Island was purchased by the U.S. Government for a military installation to guard the mouth of the St. Marys River, protect coastal and interior shipping, and defend the port of Fernandina. The fort was named in honor of General Duncan Lamont Clinch, who fought in the Second Seminole War. In 1926, it was purchased by a private interest but was later sold to the state of Florida. Fort Clinch State Park was established in 1936 and became one of the first parks in the Florida park system.

In 1896, the running of contraband to the Rebel Cuban Army during the Cuban Revolution brought new prosperity to Fernandina. During 1913 and 1914, shrimp, oyster, canning, fertilizer, and fishing industries were started in Nassau County. In 1936 and 1937, the construction of two mills was the greatest contributing factor to the economic growth of Fernandina.

Callahan, a town of 1 square mile, was incorporated in 1911. It was named for a 19th century railroad construction gang leader, Daniel Callahan. The town has always been a stopover for travelers for both the railroad and a well used road, originally named Kings, which bisects the town. The Civil War temporarily destroyed the railroad lines, but people continued to move into the Callahan area because Confederate sympathizers left threatened coastal areas and moved inland. Rail repair was completed by the late 1860's, but even with the supply lines reopened by rail, Callahan residents continued to grow their own rice, corn, cotton, and cane. Two water-powered grits mills thrived on Alligator Creek, which was the site of the 1778 Revolutionary War battle of Alligator Bridge, where the British defeated the American Patriots.

Hilliard was incorporated in 1947. It was founded in 1881 by Cuyler Walter Hilliard and James Bailey. Hilliard, a south Georgia native and Confederate Army officer in the War Between the States, went into the timber business with Bailey after the war. The town of Hilliard was a center of timber production and an agricultural community. In the early 1900's, a decision was made to move the community's main business district away from the railroad tracks, 1 block east, to border the Kings Highway, a major north-south connector road, which today is U.S. Highways 1, 23, and 301. Hilliard today remains a rural community of small shops, timber operations, and farming. Its largest employer is the Federal Aviation Administration's air traffic control center, which is a major aircraft control center for the southeast.

Bryceville is an unincorporated community in the southwest corner of Nassau County. Like many towns in the county, its existence began and flourished because of the railroad. Brandy Branch was the first name for Bryceville. Brandy Branch was a stream that meandered through Nassau County. A railroad was constructed in the mid-1850's near the stream, making it possible to market the virgin interior pine. During this time George W. Bryce built a country store. In 1879, Bryce became postmaster of the Brandy Branch Post Office, which was along the rails east of the swamp area. Perhaps to distinguish themselves from Brandy Branch as the new center of growth, Bryce changed the name of the post office to Bryceville. Lumbering was the biggest industry around Bryceville. Steam engines that ran on the railroad had an insatiable appetite for wood to fuel their fires. Many people derived income from selling firewood to the Florida Line. Woodracks were built along the line and stocked.

In 1839, in an effort to create a direct 15-mile route between Jacksonville and St. Marys, Georgia, the U.S. Congress granted $7,500 to construct Harts Road, which crossed through Nassau County in much the same location where U.S. Highway 17 runs today. The road soon became a major artery. In the late 1850's, with the addition of David Yulee's Florida Railroad (the first railroad in the state to travel from the Atlantic Ocean to the Gulf of Mexico), a community sprang up at the intersection of the railroad and the new north-south thoroughfare. After the Civil War this community, originally named Harts Road, adopted Yulee's name and continued to grow, although it has never become incorporated. Yulee remains at the crossroads of major highway and rail traffic in Nassau County.

Many communities formed in Nassau County because of the railroads, lumbering, and rivers. In 1790, Brickyard was the site of a brick plant along the St. Marys River. It did not evolve into a community until the 1840's. In 1791, Nassauville was a community in the southeastern part of the county along the Nassau River. In 1797, O'Neal was a farming community now along the Yulee-Fernandina Railroad. In the 1850's, Dyal was a farming community about 5 miles north of Callahan. By 1881, Dyal station was built along the Savannah, Florida, and Western Railroad that ran from Waycross to Jacksonville. In 1853, Orange Bluff became a lumbering community on a bluff along the St. Marys River. In 1876, Dutton was a lumbering community 12 miles south of Callahan, along the rails. In 1880, Ratliff was a lumbering settlement on the Savannah, Florida, and Western Railroad at the Duval County line. In 1880, Boulougne was a community that formed where the Savannah, Florida, and Western Railroad crossed over the St. Marys River. This community has relocated to three different locations.

In 1881, Italia had a brick factory along the railroad from Fernandina to Cedar Key and between Callahan and Yulee. In 1883, Crawford was founded as a lumbering community 4 miles south of Callahan. In 1898, it also became the eastern end of the St. Marys Railroad, which was a short lumbering railroad built into Florida from Georgia. Lessie was the site of a turpentine still north of the Wilder Swamp. In 1891, Ingehome (later Ingle) was a lumbering community 2 miles north of Bryceville and along the railroad. In 1890, Kent was a lumbering community along the St. Marys Railroad about 3 miles east of the St. Marys River. In 1901, Mattox was the southwesternmost community in Nassau County at the junction of the Seaboard and the Jacksonville and Southwestern Railroads. In 1912, Gross had a turpentine still along the railroad from Yulee to Kingsland, Georgia.

Natural Resources

Heavy minerals have higher specific gravities than quartz, or ordinary sand. Those commonly found in Florida include ilmenite, rutile, zircon, and staurolite. They are used to manufacture paint, cement, glass, electronics, and porcelain *(5)*.

Heavy minerals were mined from the Boulogne ore body on the Duval Upland about 2 miles south of Boulogne in western Nassau County *(11)*. These minerals occurred in the form of sand-size grains mixed with ordinary quartz sand grains.

Sand and clayey sand cover the surface of Nassau County to varying depths. Although they are not being mined at present, the potential for development exists for their use as base material or fill material for roads.

Soil is an important resource in the county. Soil suitability for various uses generally is based on evaluation of soil properties. Interpretations in this soil survey are made as to the effects these properties can have on use.

Agriculture

In 1983, about 300 farms were in Nassau County. Land classified as agricultural acreage made up 350,134 acres, or 84.3 percent, of the county. Of that total, 338,634 acres was in woodland, 10,750 acres in cropland, and 750 acres in pasture. The average size of a farm was about 178 acres. The total acreage in farms was 54,131.

In addition to dairy, poultry, and beef sales, Nassau County farmers produce small amounts of corn and tobacco.

Woodland makes up 338,634 acres, or 81.5 percent, of the county. It includes public land, commercial and privately owned woodland, and forest industry woodland.

Transportation Facilities

Nassau County is served by a good transportation network. Interstate Highway 95 and U.S. Highway 17 traverse the central part of the county, and U.S. Highways 1, 23, and 301 traverse the western part. Several paved state and county roads serve most of the other parts of the county.

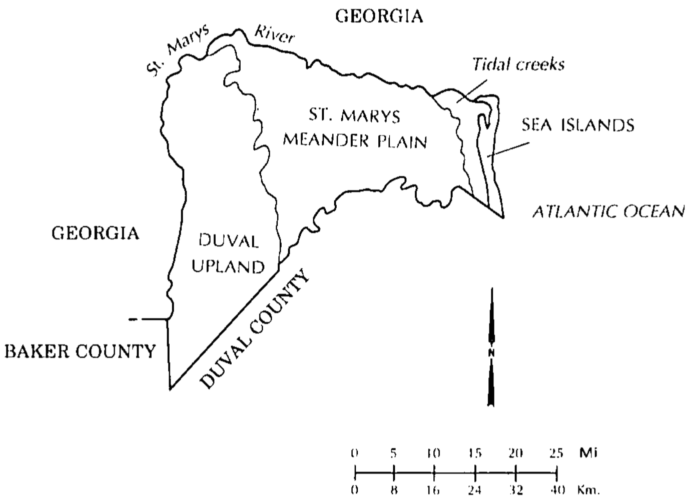


Figure 1.—Geomorphic provinces of Nassau County.

One railroad provides freight transportation in Nassau County. The Fernandina Beach Municipal Airport on Amelia Island can accommodate planes up to medium-sized jets. Commercial air passenger service is available at the nearby Jacksonville International Airport.

Geomorphology, Geology, and Hydrogeology

Richard A. Johnson, Geological Survey, Bureau of Geology, Florida Department of Natural Resources, prepared this section.

Nassau County has a humid, subtropical climate. Elevation ranges between mean sea level (m.s.l.) and about 90 feet above m.s.l. in the western part of the county. Over three-quarters of Nassau County's boundary line is formed by the St. Marys and Nassau Rivers, and these rivers were the main influence on its geomorphic evolution.

Geomorphology

Nassau County has three major geomorphic subdivisions. From east to west, they are the Sea Islands, the St. Marys Meander Plain, and the Duval Upland (fig. 1). Most of the material for this section was summarized from *The Geomorphology of the Florida Peninsula (20)*.

The county is dominated by the meandering, muddy

Nassau and St. Marys Rivers and their abandoned channels and other tributaries rather than by the marine influences that are dominant to the south of the county. The county is the southern end of a large geomorphic area, the Sea Islands, which extend north into South Carolina. These barrier islands, which are separated from the mainland by shallow, meandering tidal creeks rather than by broad, open lagoons, are characteristic of this subdivision. They are a consequence of the large amount of sediment, which is carried by the rivers and is emptied into the tidal creeks. Amelia Island is typical of the Sea Islands.

The St. Marys Meander Plain is in the central and east-central parts of the county. It is a relatively flat plain that has a maximum elevation of about 25 feet above m.s.l. It is characterized by active streams that have cut into the plain. This process has apparently been active in the past since evidence exists of many older meandering streams throughout the area.

The Duval Upland is in the western part of the county. It is a high, flat area that has elevations of 70 to 90 feet above m.s.l. The local streams and creeks in this subdivision have also formed deep valleys similar to those in the St. Marys Meander Plain to the east.

Geology

The sediments of northeastern Florida generally are divided into two categories. The first consists of several hundred feet of sand and clay at and near the surface interbedded with minor carbonate beds of limestone and dolomite. Below these sediments, the second category is a thick sequence of Cenozoic era carbonates that extend to a depth of about 2,500 feet *(6)*. The upper part of this carbonate section makes up the Floridan Aquifer. Figure 2 shows an east-to-west cross section of the county from the base of the Floridan Aquifer upward.

The Avon Park Formation consists of a thick sequence of interbedded limestone and dolomite, which has mostly been recemented and hardened through the action of ground water. The formation is about 500 to 700 feet thick. The top of the formation begins between 700 and 900 feet below the land surface *(5)*. Dolomite beds are most common at the top and base of the Avon Park Formation, which consists of very hard, brown, recrystallized, unfossiliferous dolomite. Large cracks or joints are common in this section. The limestone consists of white to light brown, very fine grained, calcite particles, which are sometimes intermixed with peat and, in places, with small fossils.

The Ocala Group consists predominantly of relatively pure white limestone. It is as much as 250 feet thick. The limestone generally is made up of the shells of microscopic, single-celled animals (foraminifera), which are poorly cemented and very crumbly to well cemented and hard. Throughout most of the county, the top of the Ocala Group limestone is between 400 and 550 feet below the land surface.

Overlying the Ocala Group is the Hawthorn Group, which consists of interbedded sand, clay, and carbonate. The beds of sand and clay are dominant except near the base of the Hawthorn Group where thick, hard, sandy carbonate beds occur. Throughout most of this group, sand-size grains of phosphate are common except in some areas where the very top of the Hawthorn Group consists of relatively thin clay and carbonate beds that are nonphosphatic to sparsely phosphatic. The Hawthorn Group is between 300 and 500 feet thick in Nassau County. The top of the Hawthorn Group is from 120 to 170 feet below the land surface.

Shell beds overlie the Hawthorn Group throughout most of the county. If present, they range up to 50 feet in thickness. The shell beds consist of clay and sand, which form the matrix for the shell material. The top of the shell beds is between 30 and 75 feet below the land surface.

The undifferentiated surficial material consists of consolidated to unconsolidated sand and clay. Shell beds are also included with this material. This material generally covers the entire county and is between 30 and 75 feet thick.

Hydrogeology

In Nassau County, most of the ground water used for private, commercial, and municipal purposes is derived from the Floridan Aquifer, which is a thick series of limestone and dolomite beds underlying the entire area. Depth to the top of the aquifer varies between 400 and 550 feet below the land surface. The Ocala Group is the uppermost group that makes up the aquifer system; however, in most commercial and city wells that are about 700 to 1,700 feet deep, water production originates in the Avon Park Formation. The Avon Park Formation is characterized by numerous joints or by fractures and caverns enhanced by the action of the ground water. Water flows freely from these cracks directly into any well that penetrates them. Most wells are cased, or lined with pipe, into the top of the limestone and are open holed, or uncased, in the hard carbonate of the aquifer system below.

Many smaller, private or commercial wells penetrate the Ocala Group limestone and are between 400 and 700 feet deep. In these wells, the water enters the

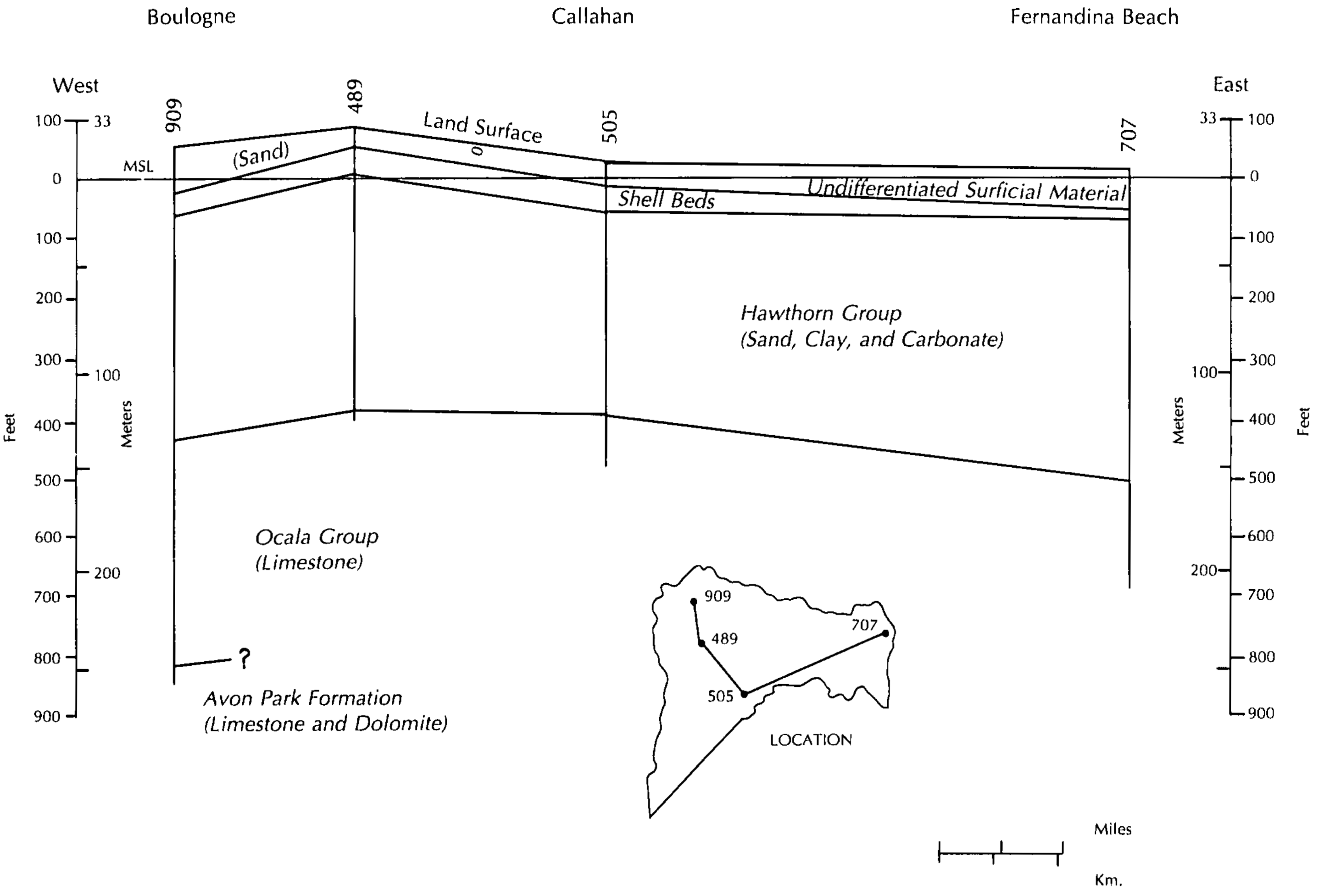

Boulogne
Callahan
Fernandina Beach
West
East
909
489
505
707
Land Surface
(Sand)
MSL
Shell Beds
Undifferentiated Surficial Material
Hawthorn Group
(Sand, Clay, and Carbonate)
Ocala Group
(Limestone)
?
Avon Park Formation
(Limestone and Dolomite)
Feet
Meters
100
33
0
100
200
300
400
500
600
700
800
900
200
LOCATION
Miles
Km.

Figure 2.—An east-to-west geologic cross section of Nassau County.

uncased part of the well from between the tiny shells (foraminifera) that make up the Ocala Group. These wells generally do not provide as much water as the deeper wells because water flows more easily and quickly from large joints or fractures in the Avon Park Formation than from the tiny intergranular pore spaces between foraminifera in the Ocala Group. Deeper wells also penetrate more of the aquifer; therefore, they penetrate a thicker section of water-bearing material.

The freshwater of the Floridan Aquifer is underlain by saltwater at varying depths throughout the county. Near the coast of Fernandina Beach, many very deep and large diameter industrial wells have been used to remove large quantities of freshwater for a long time. This causes the upward movement of saltwater, or saltwater intrusion. The saltwater mixes with the freshwater and causes many problems. To decrease this mixing, most of the wells have been backplugged with cement to a more shallow depth, and other shallower wells have been drilled over a wider area.

In some areas of the county, a very shallow, relatively thin surficial bed of carbonate rock at the top of the Hawthorn Group provides some small private wells that produce good quality water. Because this bed is thin and discontinuous and because it does not contain as much water as the Floridan Aquifer, it can only be considered a minor source of water in Nassau County.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; and the kinds of crops and native plants growing on the soils. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size, and shape of soil aggregates, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called soils of minor extent.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

Use of Ground-Penetrating Radar

In Nassau County, a ground-penetrating radar (GPR) system *(8, 9, 10, 12)* and hand transects were used to document the type of variablility of the soils in the detailed soil map units. About 510 random transects were made with the GPR and by hand. Information from notes and ground-truth observations made in the field was used with radar data from this study to classify the soils and to determine the composition of map units. The map units, as described in the section "Detailed Soil Map Units," are based on this data.

Confidence Limits of Soil Survey Information

Confidence limits are statistical expressions of the probability that the composition of a map unit or a property of the soil will vary within prescribed limits. Confidence limits can be assigned numerical values based on a random sample. In the absence of specific data to determine confidence limits, the natural variability of soils and the way soil surveys are made must be considered. The composition of map units and other information are derived largely from extrapolations made from a small sample. Also, information about the soils does not extend below a depth of about 6 feet. The information presented in the soil survey is not meant to be used as a substitute for onsite investigation. Soil survey information can be used to select alternative practices or general designs that may be needed to minimize the possibility of soil-related failures. It cannot be used to interpret specific points on the landscape.

Specific confidence limits for the composition of most map units in Nassau County were determined by random transects made with the GPR across mapped areas. The data are statistically summarized in the description of each soil in the section "Detailed Soil Map Units." Soil scientists made enough transects and took enough samples to characterize each map unit at a specific confidence level. For example, in 95 percent of the areas mapped as Leon fine sand, Leon soil will be within the range given in the map unit description. In about 5 percent of this map unit, the percentage of Leon soil can be higher or lower than the given range.

The composition of miscellaneous areas and urban map units was based on the judgment of the soil scientist and was not determined by a statistical procedure.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soils on the Sand Ridges and Coastal Dunes

The four general soil map units in this group consist of nearly level to moderately steep, excessively drained to poorly drained soils that are sandy to a depth of 80 inches or more. Some of the soils are loamy below a depth of 40 inches. These map units are in the eastern part of the county. They are also along an area east of Boulogne to west of Callahan, southward along the St. Marys River, and in a small area near Evergreen.

1. Kureb-Fripp-Newhan

Nearly level to rolling, excessively drained, sandy soils; in high positions on the landscape

The soils in this map unit are on narrow, rolling, sandy, dunelike ridges interspersed with narrow swales. These ridges and swales are elongated, and their long axis generally is oriented from the north to the south. They are parallel to the Atlantic Ocean coast and extend inland for about 1 to 2 miles in the northern and southern parts of the county and about 0.5 mile in the central part of Amelia Island. The ridges form the primary dunes adjacent to the ocean beach and to the relict beach dunes farther inland. The height of the ridges ranges from 4 to 35 feet, and the slope generally is 8 to 100 feet or more in length. An area of soils that are similar to the Kureb-Fripp-Newhan soils is in downtown Fernandina Beach. Slopes are complex. This map unit is elongated and is relatively large in size.

This map unit makes up about 6,230 acres, or 1.5 percent, of the county. It is about 20 percent Kureb soils, 15 percent Fripp soils, 11 percent Newhan soils, and 54 percent soils of minor extent (fig. 3).

The natural vegetation consists of live oak and water oak. The understory includes saw palmetto, yaupon, and wiregrass on Kureb and Fripp soils and seaoats on Newhan soils.

The Kureb soils are nearly level to rolling on ridges and nearly level and gently sloping in areas just west of the ridges. The surface layer is gray fine sand about 5 inches thick. The subsurface layer, to a depth of about 19 inches, is light brownish gray fine sand. The underlying material extends to a depth of 80 inches or more. It is strong brown fine sand and has tongues of white fine sand in the upper part and yellowish brown, brownish yellow, yellow, and very pale brown fine sand in the lower part.

The Fripp soils are rolling and are on ridges that can support trees. These soils are west of the Newhan soils. The surface layer is light brownish gray fine sand about 4 inches thick. The underlying material, to a depth of 80 inches or more, is very pale brown fine sand.

The Newhan soils are rolling and are on ridges that do not support trees. These soils generally are west of the beaches. The surface layer is white fine sand about 8 inches thick. The underlying material, to a depth of about 80 inches, is very pale brown fine sand.

Of minor extent in this map unit are Beaches and Corolla, Echaw, Kershaw, Leon, Mandarin, Tisonia, and Resota soils.

In most areas the soils in this map unit are used for urban development. The remaining acreage is in woodland. Many beach houses have been built along the Atlantic Ocean.

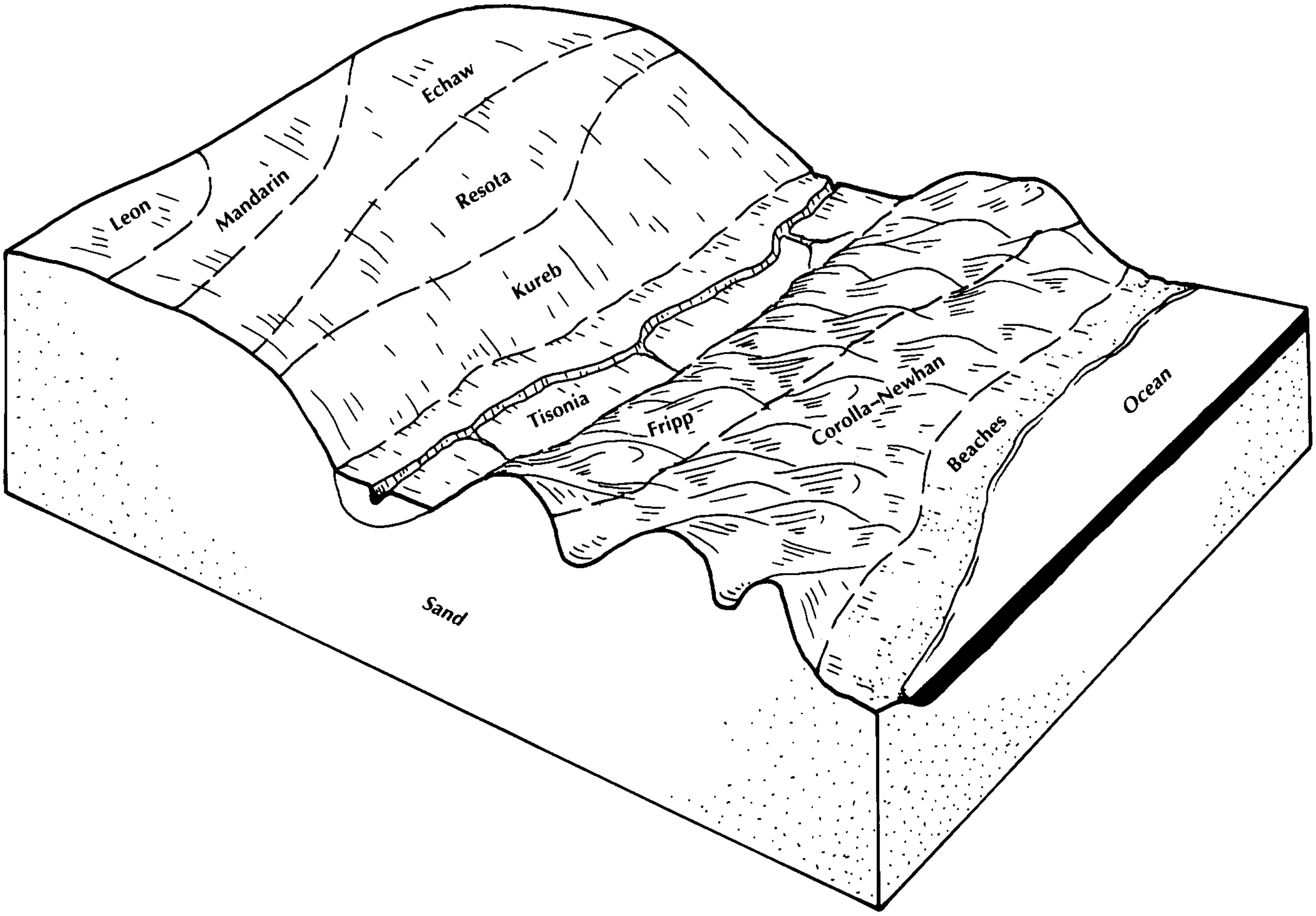


Figure 3.—Typical pattern of soils and parent material in an area of the Kureb-Fripp-Newhan and Mandarin-Echaw map units.

2. Mandarin-Echaw

Nearly level, somewhat poorly drained and moderately well drained soils; in high positions on the landscape

The soils in this map unit are in slightly elevated flatwood areas. The map unit is on Amelia Island in the eastern part of the county.

This map unit makes up about 4,570 acres, or 1.1 percent, of the county. It is about 66 percent Mandarin soils, 9 percent Echaw soils, and 25 percent soils of minor extent (fig. 3).

The natural vegetation consists of slash pine, longleaf pine, water oak, and live oak. The understory includes saw palmetto, fetterbush lyonia, and pineland threeawn.

The Mandarin soils are somewhat poorly drained. The surface layer is very dark gray fine sand about 6 inches thick. The subsurface layer, to a depth of about 20 inches, is gray and light gray fine sand. The subsoil extends to a depth of about 31 inches. It is dark reddish brown fine sand in the upper part and yellowish brown fine sand in the lower part. The substratum, to a depth of 80 inches or more, is white fine sand.

The Echaw soils are moderately well drained. The surface layer is very dark gray fine sand about 6 inches thick. The subsurface layer, to a depth of about 35 inches, is light gray fine sand. The upper part of the subsoil, to a depth of about 38 inches, is dark brown fine sand. Separating the upper and lower parts of the subsoil, to a depth of about 78 inches, are buried subsurface layers. In sequence downward, these layers are yellowish brown, light yellowish brown, light gray, and brown fine sand. The lower part of the subsoil, to a depth of 80 inches or more, is dark reddish brown fine sand.

Of minor extent in this map unit are Leon and Resota soils.

The soils in this map unit mostly support natural vegetation. In some areas they are used for urban development.

3. Ridgewood-Hurricane-Pottsburg

Nearly level and gently sloping, somewhat poorly drained and poorly drained, sandy soils; in high positions on the landscape

The soils in this map unit are on slightly elevated ridges interspersed with flatwoods, depressions, and drainageways. The map unit is in the eastern and western parts of the county and in one small area near Evergreen. The individual mapped areas are irregular in shape or elongated and are small to relatively large in size.

This map unit makes up about 34,060 acres, or 8.2 percent, of the county. It is about 22 percent Ridgewood soils, 21 percent Hurricane soils, 17 percent Pottsburg soils, and 40 percent soils of minor extent.

The natural vegetation consists of longleaf pine, slash pine, turkey oak, bluejack oak, and live oak. The understory includes American holly, gallberry, saw palmetto, pineland threeawn, and bluestem.

The nearly level and gently sloping Ridgewood soils are somewhat poorly drained. The surface layer is gray fine sand about 7 inches thick. The subsoil, to a depth of about 24 inches, is light yellowish brown fine sand. The substratum, to a depth of 80 inches or more, is fine sand. It is light yellowish brown in the upper part, pale brown in the next part, and light gray in the lower part.

The nearly level and gently sloping Hurricane soils are somewhat poorly drained. The surface layer is grayish brown fine sand about 5 inches thick. The subsurface layer, to a depth of about 68 inches, is fine sand. It is yellowish brown in the upper part, light yellowish brown in the next part, and light gray in the lower part. The subsoil, to a depth of 80 inches or more, is fine sand. It is dark brown in the upper part and dark reddish brown in the lower part.

The nearly level Pottsburg soils are poorly drained. The surface layer is very dark gray fine sand about 8 inches thick. The subsurface layer, to a depth of about 55 inches, is fine sand. It is brown in the upper part, dark gray in the next part, and gray in the lower part. The subsoil, to a depth of 80 inches or more, is dark reddish brown fine sand.

Of minor extent in this map unit are Albany, Blanton, Centenary, Leon, Lynn Haven, Mandarin, Ortega, Rutlege, and Wesconnett soils.

The soils in this map unit mostly support natural vegetation or have been planted to woodland. In some areas they are used for urban development.

4. Albany-Blanton-Penney

Nearly level to moderately steep, somewhat poorly drained, moderately well drained, and excessively drained soils; in high positions on the landscape

The soils in this map unit are on slightly elevated and elevated ridges and on the uplands. The map unit is generally along the St. Marys River. The individual mapped areas are irregular in shape or elongated and are small or medium in size.

This map unit makes up about 17,446 acres, or 4.2 percent, of the county. It is about 46 percent Albany soils, 14 percent Blanton soils, 7 percent Penney soils, and 33 percent soils of minor extent (fig. 4).

The natural vegetation on the ridges consists of longleaf pine, slash pine, water oak, turkey oak, and live oak. The understory includes gallberry, pineland threeawn, and bluestem. The natural vegetation on the uplands consists of longleaf pine, live oak, and turkey oak. The understory includes bluestem and pineland threeawn.

The nearly level and gently sloping Albany soils are somewhat poorly drained. The surface layer is very dark gray fine sand about 2 inches thick. The subsurface layer extends to a depth of about 50 inches. It is fine sand. It is yellowish brown in the upper part, light yellowish brown in the next part, and light gray in the lower part. The subsoil, to a depth of about 80 inches, is yellowish brown fine sandy loam in the upper part, grayish brown sandy clay loam in the next part, and olive gray sandy clay loam in the lower part.

The nearly level to moderately steep Blanton soils are somewhat poorly drained or moderately well drained. The surface layer is very dark grayish brown fine sand about 5 inches thick. The upper part of the subsurface layer, to a depth of about 22 inches, is yellowish brown fine sand. The lower part, to a depth of about 49 inches, is light gray fine sand. The subsoil, to a depth of 80 inches or more, is brownish yellow fine sandy loam in the upper part, brownish yellow sandy clay loam in the next part, and mottled sandy clay loam in the lower part.

The nearly level and gently sloping Penney soils are excessively drained. The surface layer is dark gray fine sand about 5 inches thick. The subsurface layer, to a depth of about 41 inches, is light yellowish brown and very pale brown fine sand. The subsoil, to a depth of 80 inches or more, is very pale brown fine sand that has

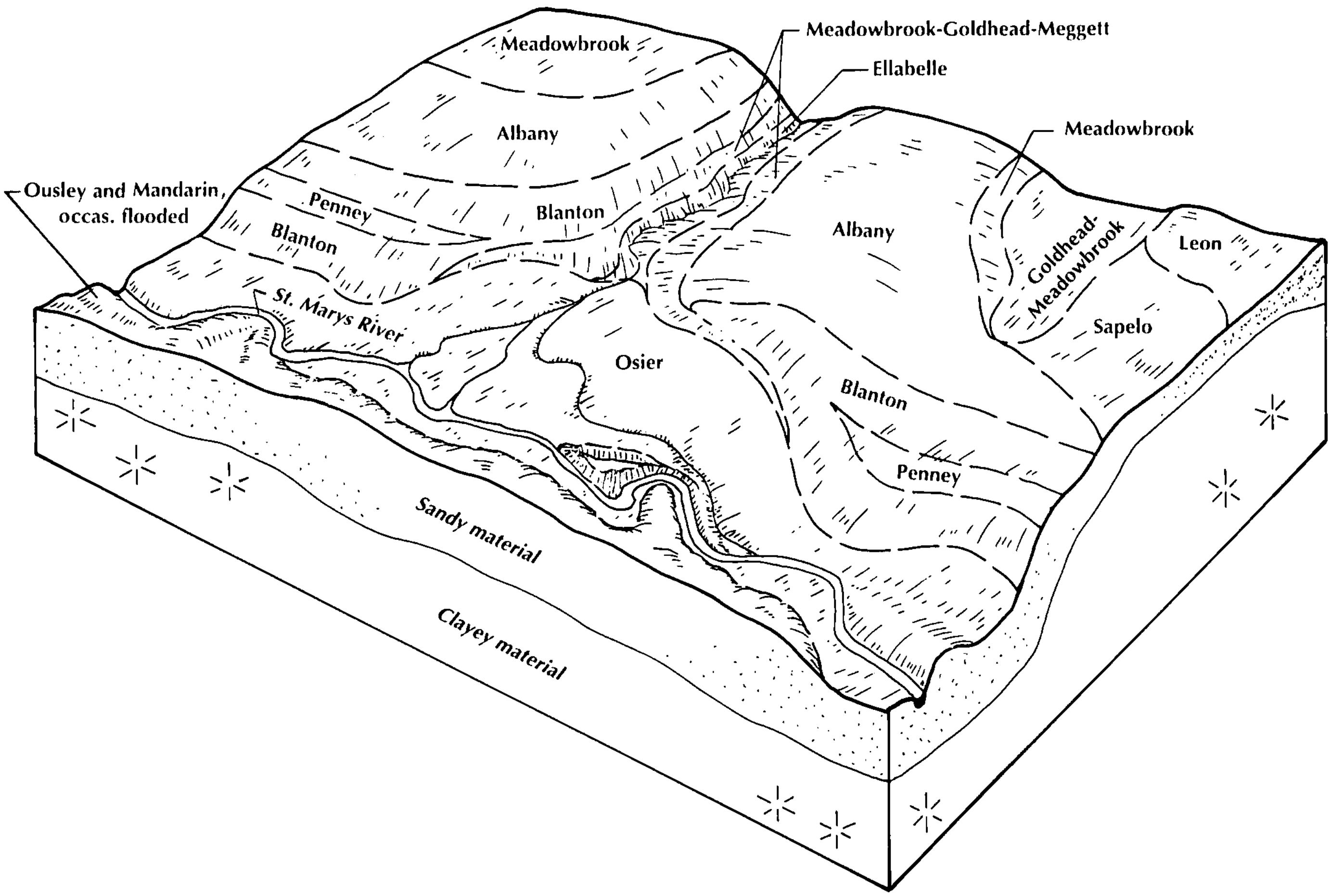

Meadowbrook
Meadowbrook-Goldhead-Meggett
Ellabelle
Meadowbrook
Albany
Ousley and Mandarin, occas. flooded
Penney
Blanton
Blanton
Albany
Goldhead-Meadowbrook
Leon
St. Marys River
Sapelo
Osier
Blanton
Penney
Sandy material
Clayey material

Figure 4.—Typical pattern of soils and parent material in an area of the Albany-Blanton-Penney and Osier-Ousley-Mandarin map units.

thin strong brown loamy fine sand lamellae.

Of minor extent in this map unit are Ellabelle, Kershaw, Leefield, Leon, Mandarin, Meggett, Ocilla, Ortega, Osier, Ousley, Goldhead, Meadowbrook, Ridgewood, and Sapelo soils.

The soils in this map unit are mostly in woodland. In some cleared areas they are used as pasture. A small acreage is used for urban development.

Soils on the Flatwoods

The four general soil map units in this group consist of nearly level and gently sloping, poorly drained and very poorly drained, sandy soils that generally have a dark subsoil within 30 inches of the surface. Some of the soils have a dark subsoil below a depth of 30 inches. These map units are in the eastern part of the county.

5. Leon-Boulogne-Kingsferry

Nearly level, poorly drained and very poorly drained soils that are sandy throughout; in low positions on the landscape

The soils in this map unit are on flatwoods interspersed with grassy ponds, drainageways, and small, grassy, wet depressions. The map unit is in the eastern and western parts of the county. The individual mapped areas vary in shape and size (fig. 5).

This map unit makes up about 118,800 acres, or 28.6 percent, of the county. It is about 34 percent Leon soils, 25 percent Boulogne soils, 13 percent Kingsferry soils, and 28 percent soils of minor extent.

The natural vegetation on the flatwoods consists of longleaf pine and slash pine. The understory includes saw palmetto, gallberry, pineland threeawn, and

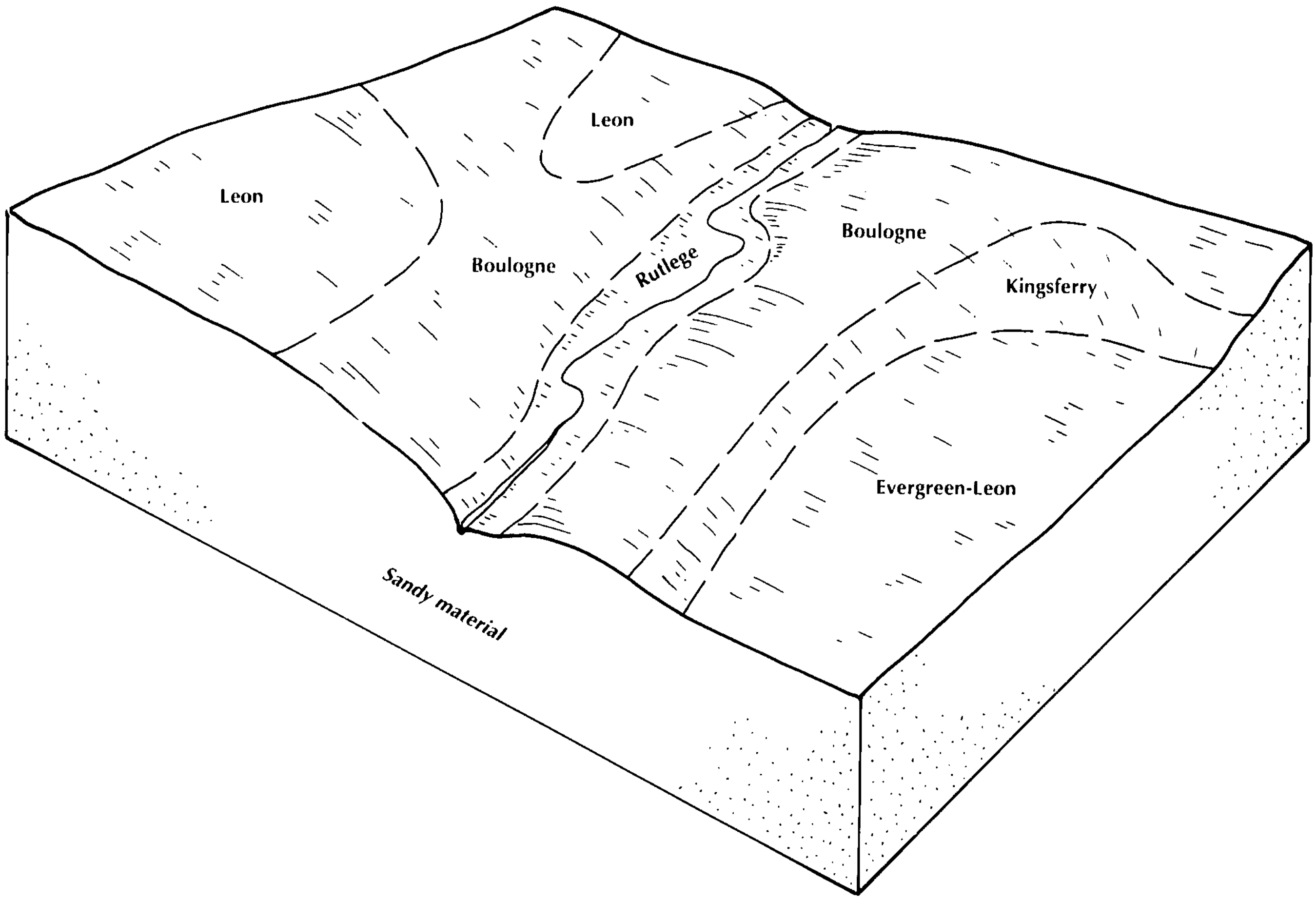


Figure 5.—Typical pattern of soils and parent material in an area of the Leon-Boulogne-Kingsferry map unit.

bluestem. The natural vegetation in the ponds, depressions, and drainageways consists dominantly of pond pine, cypress, and sweetgum. The understory includes water-tolerant grasses.

The Leon soils are poorly drained and very poorly drained. The surface layer is very dark gray fine sand about 7 inches thick. The subsurface layer, to a depth of about 18 inches, is gray fine sand. The upper part of the subsoil, to a depth of about 31 inches, is black and dark reddish brown fine sand. Separating the upper and lower parts of the subsoil, to a depth of about 37 inches, is a buried subsurface layer of yellowish brown fine sand. The lower part of the subsoil, to a depth of 80 inches or more, is dark brown and black fine sand.

The Boulogne soils are poorly drained. The surface layer is fine sand about 10 inches thick. It is very dark gray in the upper part and dark gray in the lower part. The upper part of the subsoil, to a depth of about 13 inches, is dark brown fine sand. Separating the upper and lower parts of the subsoil, to a depth of about 33 inches, are buried subsurface layers of fine sand. In sequence downward, these layers are grayish brown, dark grayish brown, and light gray. The lower part of the subsoil, to a depth of 80 inches or more, is loamy fine sand. In sequence downward, it is dark brown, black, and dark reddish brown and black.

The Kingsferry soils are very poorly drained. The surface layer is fine sand about 7 inches thick. It is very dark gray in the upper part and dark gray in the lower part. The subsurface layer, to a depth of about 24 inches, is dark gray fine sand. The subsoil, to a depth of about 80 inches, is fine sand. It is very dark gray in the upper part, dark reddish brown in the next part, and black in the lower part.

Of minor extent in this map unit are Evergreen, Hurricane, Lynn Haven, Pottsburg, Ridgewood, Rutlege, and Wesconnett soils.

The soils in this map unit mostly support natural vegetation. In most cleared areas they are pastured. In some areas they are used for urban development.

6. Sapelo-Leon-Goldhead

Nearly level, poorly drained soils that are sandy in the upper part and loamy or sandy in the lower part; in low positions on the landscape

The soils in this map unit are on flatwoods interspersed with grassy sloughs and cypress ponds. Areas of this map unit are near and around Interstate 95 and U.S. Highway 17 in the east-central part of the county. The individual mapped areas vary in shape and size.

This map unit makes up about 9,140 acres, or 2.2 percent, of the county. It is about 53 percent Sapelo soils, 31 percent Leon soils, 11 percent Goldhead soils, and 5 percent soils of minor extent.

The natural vegetation on the flatwoods is mixed longleaf pine and slash pine. The understory consists dominantly of saw palmetto, gallberry, pineland threeawn, and bluestem. The natural vegetation in the sloughs is slash pine, and the understory is pineland threeawn. The natural vegetation in the depressions is cypress, pond pine, and sweetgum. The understory includes water-tolerant grasses.

The Sapelo soils have a black fine sand surface layer about 6 inches thick. The subsurface layer, to a depth of about 21 inches, is gray and light gray fine sand. The upper part of the subsoil, to a depth of about 43 inches, is black and brown fine sand. The lower part of the subsoil, to a depth of about 70 inches, is gray and light brownish gray fine sandy loam. The substratum, to a depth of about 80 inches, is gray loamy fine sand.

The Leon soils have a very dark gray fine sand surface layer about 5 inches thick. The subsoil is fine sand to a depth of 80 inches or more. In sequence downward, it is black and dark reddish brown, dark brown, pale brown, and light gray.

The Goldhead soils have a black fine sand surface layer about 8 inches thick. The subsurface layer, to a depth of about 33 inches, is fine sand. It is dark gray in the upper part and gray in the lower part. The subsoil, to a depth of about 69 inches, is olive gray sandy clay loam. The substratum, to a depth of 80 inches or more, is greenish gray loamy fine sand.

Of minor extent in this map unit are Albany, Ellabelle, and Meadowbrook soils.

The soils in this map unit mostly support natural vegetation. In most cleared areas they are pastured. In some areas these soils are used for urban development.

7. Goldhead-Chaires-Meadowbrook

Nearly level and gently sloping, poorly drained and very poorly drained soils that are sandy in the upper part and loamy in the lower part; in low positions on the landscape

The soils in this map unit are in the slightly lower positions on broad, smooth flatwoods interspersed with cypress depressions. This map unit is in the central and western parts of the county.

This map unit makes up about 97,200 acres, or 23.4 percent, of the county. It is about 51 percent Goldhead soils, 21 percent Chaires soils, 7 percent Meadowbrook soils, and 21 percent soils of minor extent.

The natural vegetation on the flatwoods is slash pine, loblolly pine, longleaf pine, sweetgum, blackgum, water oak, and maple. The understory includes gallberry, waxmyrtle, briers, pineland threeawn, bluestem, and a few saw palmettos. The vegetation in the depressions is ferns, water-tolerant grasses, pond pine, and cypress.

The nearly level and gently sloping, poorly drained and very poorly drained Goldhead soils have a black fine sand surface layer about 8 inches thick. The subsurface layer, to a depth of about 33 inches, is fine sand. It is dark gray in the upper part and gray in the lower part. The subsoil, to a depth of about 69 inches, is olive gray sandy clay loam. The substratum, to a depth of about 80 inches, is greenish gray loamy fine sand.

The nearly level, poorly drained Chaires soils have a black fine sand surface layer about 7 inches thick. The subsurface layer, to a depth of about 18 inches, is gray fine sand. The subsoil extends to a depth of about 80 inches. In sequence downward, it is black fine sand, dark reddish brown fine sand, yellowish brown fine sand, light brownish gray sandy clay loam, light gray sandy clay loam, and brownish gray fine sandy loam.

The nearly level and gently sloping, poorly drained and very poorly drained Meadowbrook soils have a fine sand surface layer about 10 inches thick. It is black in the upper part and dark gray in the lower part. The subsurface layer, to a depth of about 44 inches, is light brownish gray fine sand. The subsoil extends to a depth of 80 inches or more. It is light brownish gray fine sandy loam in the upper part and gray sandy clay loam in the lower part.

Of minor extent in this map unit are Albany, Croatan,

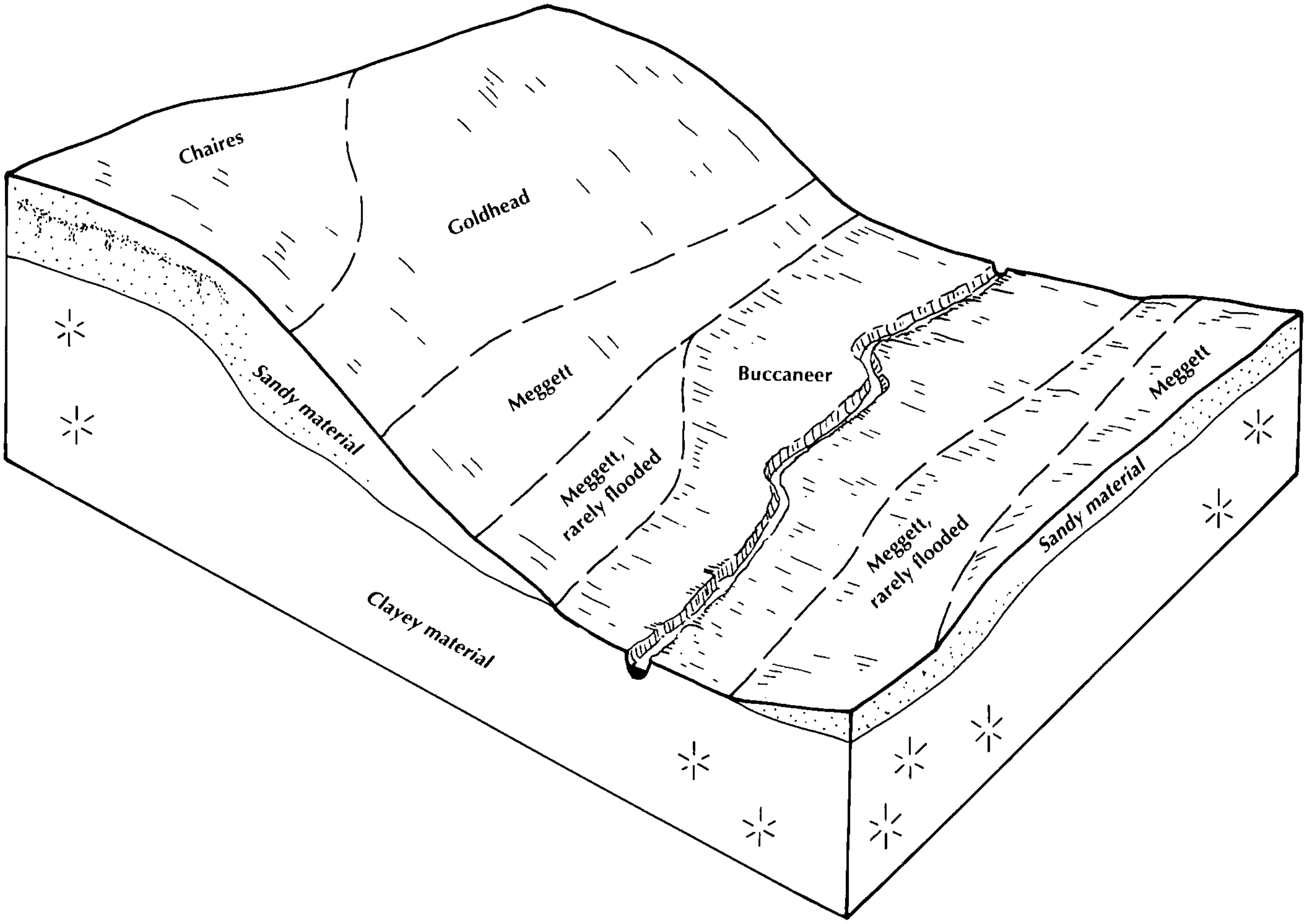


Figure 6.—Typical pattern of soils and parent material in an area of the Meggett-Goldhead map unit.

Ellabelle, Leefield, Meggett, Ocilla, Buccaneer, and Sapelo soils.

The soils in this map unit mostly support natural vegetation. In some areas they are pastured. In a few areas these soils are used for urban development.

8. Meggett-Goldhead

Nearly level and gently sloping, poorly drained and very poorly drained soils that are sandy in the upper part and clayey or loamy in the lower part; in low positions on the landscape

The soils in this map unit generally are in the slightly elevated, low positions on the broad, nearly smooth flatwoods interspersed with cypress depressions. In some areas they are adjacent to drainageways and flood plains. In some areas these soils are subject to rare flooding. This map unit is in an area about 4 to 7 miles wide in a north-south direction through Callahan and northeast of Hilliard to Kingsferry.

This map unit makes up about 44,030 acres, or 10.6 percent, of the county. It is about 64 percent Meggett soils, 23 percent Goldhead soils, and 13 percent soils of minor extent (fig. 6).

The natural vegetation is slash pine, loblolly pine, sweetgum, and red maple. The understory includes gallberry, pineland threeawn, and various bluestems and sedges. Cabbage palm and sawgrass are in the areas that are flooded.

The nearly level, poorly drained and very poorly drained Meggett soils have a loamy fine sand surface layer about 12 inches thick. The surface layer is very dark gray in the upper part and dark gray in the lower part. The subsurface layer, to a depth of about 16 inches, is light brownish gray loamy fine sand. The subsoil extends to a depth of 80 inches or more. In sequence downward, it is grayish brown sandy clay, gray clay, grayish brown clay, and light olive gray clay.

The nearly level and gently sloping, poorly drained and very poorly drained Goldhead soils have a very dark gray fine sand surface layer about 8 inches thick. The subsurface layer extends to a depth of about 26 inches. It is dark grayish brown fine sand in the upper part and grayish brown fine sand in the lower part. The subsoil extends to a depth of 80 inches or more. In sequence downward, it is grayish brown sandy clay loam, grayish brown clay, light gray clay, and light olive gray clay.

Of minor extent in this map unit are Brookman, Ocilla, Chaires, and Buccaneer soils.

The soils in this map unit mostly support natural vegetation. In some areas they are pastured. In other areas these soils are used for urban development.

Soils in the Swamps and on the Flood Plains

The three general soil map units in this group consist of level to gently sloping, somewhat poorly drained to very poorly drained soils. Some of the soils have an organic layer more than 51 inches deep; some have a clayey subsoil within 20 inches of the surface; some are sandy and have a loamy subsoil between depths of 20 to 40 inches; and some are sandy or are sandy and have a dark subsoil. These map units are in swamps along the St. Marys River, the Nassau River, the Little St. Marys River, Mills Creek, and Alligator Creek in the central, northern, and southern parts of the county.

9. Kingsland-Maurepas

Level and nearly level, very poorly drained, organic soils; in low positions on the landscape

The soils in this map unit are in large, low-lying swamps on the flood plains. They are along the St. Marys River, the Nassau River, the Little St. Marys River, Mills Creek, and Alligator Creek in the central, northern, and southern parts of the county. In most of these areas, the soils are flooded for long periods.

This map unit makes up about 9,555 acres, or 2.3 percent, of the county. It is about 49 percent Kingsland soils, 46 percent Maurepas soils, and 5 percent soils of minor extent.

The natural vegetation in the swamp hardwoods consists of water tupelo, sweetgum, bay, baldcypress, and pond pine. The understory includes greenbrier, fetterbush lyonia, aster, and willow.

The Kingsland soils are black mucky peat to a depth of 65 inches or more.

The Maurepas soils have a very dark brown muck surface layer about 5 inches thick. The next layer, to a depth of 65 inches or more, is black muck.

Of minor extent in this map unit are Croatan soils. These soils are in similar landscape positions as the Kingsland and Maurepas soils.

The soils in this map unit support natural vegetation. They are used mostly as habitat for wildlife.

10. Buccaneer-Ellabelle

Nearly level, very poorly drained soils; in low positions on the landscape

The soils in this map unit are in swamps and drainageways on the flood plains. The map unit is in the central and southern parts of the county. The individual mapped areas are narrow and elongated.

This map unit makes up about 43,615 acres, or 10.5 percent, of the county. It is about 62 percent Buccaneer soils, 32 percent Ellabelle soils, and 6 percent soils of minor extent.

The natural vegetation is dominantly baldcypress, sweetgum, blackgum, water tupelo, water oak, and pond pine.

The Buccaneer soils have a black clay loam surface layer about 5 inches thick. The subsoil, to a depth of about 65 inches, is clay. It is very dark gray in the upper part, dark gray in the next part, and gray in the lower part. The substratum, to a depth of about 80 inches, is light olive gray clay.

The Ellabelle soils have a black mucky fine sand surface layer about 22 inches thick. The subsoil, to a depth of about 80 inches, is sandy clay loam. It is dark gray in the upper part and gray in the lower part.

Of minor extent in this map unit are Croatan and Kingsferry soils.

The soils in this map unit support natural vegetation.

11. Osier-Ousley-Mandarin

Nearly level and gently sloping, poorly drained and somewhat poorly drained, sandy soils; in low positions on the landscape

The soils in this map unit are on elevated ridges and on flood plains interspersed with swamps, depressions, oxbows, and slight knolls or small bluffs adjoining the St. Marys River. Extreme variations in the water level of the St. Marys River affect the water table of the soils. The individual mapped areas are mostly narrow and elongated.

This map unit makes up about 3,740 acres, or 0.9 percent, of the county. It is about 53 percent Osier soils, 22 percent Ousley soils, 6 percent Mandarin soils, and 19 percent soils of minor extent (fig. 4).

The natural vegetation on the flood plains is dominantly pond pine, baldcypress, water tupelo, sweetgum, and water oak. The understory includes saw palmetto, gallberry, waxmyrtle, and bluestem. The natural vegetation on the slightly elevated ridges consists of slash pine, loblolly pine, longleaf pine, scattered blackjack oak, turkey oak, post oak, willow oak, and red maple. The understory includes gallberry, saw palmetto, running oak, pineland threeawn, and bluestem.

The Osier soils are nearly level and poorly drained. The surface layer is fine sand about 14 inches thick. It is very dark gray in the upper part and dark grayish brown in the lower part. The underlying material extends to a depth of about 80 inches. It is grayish brown, light brownish gray, and dark grayish brown fine sand in the upper part; grayish brown fine sandy loam in the next part; and white fine sand in the lower part.

The Ousley soils are nearly level and gently sloping and are somewhat poorly drained. The surface layer is dark gray fine sand about 7 inches thick. The underlying material is fine sand to a depth of about 80 inches. In sequence downward, it is pale brown, olive yellow, yellow, light yellowish brown, and brown.

The Mandarin soils are nearly level and somewhat poorly drained. The surface layer is gray fine sand about 7 inches thick. The subsurface layer, to a depth of about 11 inches, is light brownish gray fine sand. The subsoil, to a depth of about 80 inches, is dark brown fine sand in the upper part and yellowish brown fine sand in the lower part.

Of minor extent in this map unit are Ellabelle, Kingsferry, and Goldhead soils. These soils are in similar landscape positions as the Osier, Ousley, and Mandarin soils.

The soils in this map unit support natural vegetation.

Soils in the Tidal Marsh

This map unit consists of level and nearly level, very poorly drained, saline, organic soils underlain by clayey material. These soils are in the eastern part of the county. They are in broad, tidal marshes along the St. Marys River, the Nassau River, Egans Creek, and the Intracoastal Waterway.

12. Tisonia

Level and nearly level, very poorly drained, saline, organic soils; in low positions on the landscape

The soils in this map unit are in the eastern part of the county. They are in tidal marshes along the St. Marys River, the Nassau River, Egans Creek, and the Intracoastal Waterway. The tidal marshes are saline in most places but are brackish where small feeder streams enter. These soils are flooded daily.

This map unit makes up about 27,000 acres, or 6.5 percent, of the county. It is about 96 percent Tisonia soils and 4 percent soils of minor extent.

The natural vegetation consists of needlegrass rush and sand cordgrass.

The Tisonia soils have a very dark grayish brown mucky peat surface layer about 40 inches thick. The underlying material, to a depth of about 65 inches, is dark olive gray clay.

Of minor extent in this map unit are Arents and Kingsland, Leon, and Maurepas soils.

The soils in this map unit mostly support natural vegetation. In most places they are used as spawning areas for many commercially important finfish and shellfish.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Blanton fine sand, 12 to 20 percent slopes, is a phase of the Blanton series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Meadowbrook-Goldhead-Meggett complex, 2 to 5 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in the mapped areas are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Ousley and Mandarin fine sands, occasionally flooded, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. The map unit Beaches is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 3 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

2—Arents, nearly level. These nearly level soils are made up of heterogeneous overburden material that was removed from other areas and used in land leveling or as fill material to elevate building sites. They are a mixture of fine sand and fragments of the loamy subsoil material or the dark sandy subsoil material from the associated Hurricane, Leon, Mandarin, Chaires, and Goldhead soils. The individual mapped areas are triangular or polygonal in shape and range from about 3 to 100 acres. Slopes are 0 to 2 percent.

Typically, these soils are variable and have discontinuous lenses, pockets, and streaks of black, gray, and grayish brown sand. Few or common black and dark reddish brown sandy fragments and gray loam fragments are at a depth of 20 inches or more. Some soils occurring in areas of this map unit are similar to Arents, but they generally are used for sanitary landfills.

Included in this map unit are small areas of dissimilar soils. These soils contain shell fragments, rocks, organic matter, or muck.

The permeability of Arents is variable but generally is rapid. The available water capacity is variable but generally is low. The seasonal high water table is at a depth of 18 to 30 inches for 2 to 6 months of the year. The soil is low in natural fertility.

These areas are used for building site development except in areas of sanitary landfills. They are moderately suited to pasture.

These soils are moderately suited to recreational development. Erosion and sedimentation can be controlled and the esthetic value of the area can be enhanced by maintaining adequate plant cover. The plant cover can be maintained by controlling traffic.

This map unit has not been assigned a land capability classification nor a woodland ordination symbol.

3—Beaches. Beaches consist of narrow strips of nearly level fine sand along the Atlantic Ocean. They are inundated with salt water daily at high tide. The soil is a mixture of quartz sand and shell fragments, is bare of vegetation, and is subject to movement by wind and tide.

Beaches are used intensively for sunbathing and water-related recreational activities. Other uses are not practical because of the unique location of the Beaches, their value for recreational activities, and the daily tidal flooding. These areas are important as nesting grounds for sea turtles.

This map unit has not been assigned a land capability classification nor a woodland ordination symbol.

4—Echaw fine sand. This nearly level, moderately well drained soil is on narrow to broad ridges. The mapped areas range from about 3 to 50 acres. Slopes are smooth, convex, or concave and are 0 to 2 percent.

In 88 percent of the areas mapped as Echaw fine sand, Echaw soils make up 84 to 91 percent of the map unit. Dissimilar soils make up 9 to 16 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is very dark gray fine sand about 6 inches thick. The subsurface layer, to a depth of about 35 inches, is light gray fine sand. The upper part of the subsoil, to a depth of about 38 inches, is dark brown fine sand. Separating the upper and lower parts of the subsoil are buried subsurface layers that are fine sand to a depth of about 78 inches. In sequence downward, these layers are yellowish brown, light yellowish brown, light gray, and brown. The lower part of the subsoil, to a depth of 80 inches or more, is dark reddish brown fine sand.

Included in this map unit are small areas of dissimilar soils. These are Leon, Lynn Haven, Mandarin, and Resota soils. Leon and Mandarin soils are on flatwoods. Lynn Haven soils are in depressions. Resota soils are on the slightly higher ridges. Also included are soils that are somewhat excessively drained.

Permeability of this Echaw soil is moderately rapid. The available water capacity is very low or low in the surface and subsurface layers and in the substratum and is low in the subsoil. The seasonal high water table is at a depth of 30 to 60 inches for 6 to 9 months of the year. The soil is very low in natural fertility.

In most areas this soil is used for urban development. In a few areas it is used as woodland.

The natural vegetation consists of slash pine, longleaf pine, water oak, and live oak. The understory includes saw palmetto and fetterbush lyonia. The most common grasses are pineland threeawn, lopsided indiangrass, switchgrass, panicum, paspalum, creeping bluestem, broomsedge bluestem, and splitbeard bluestem.

This soil is moderately suited to slash pine and is poorly suited to longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine is 50 feet. The potential production is 18 cords per acre for slash pine *(7)* based on a 25-year rotation. The average site index for longleaf pine is 60 feet. The estimated potential production is 30 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are seedling mortality, the equipment limitation, and plant competition. During some periods of heavy rainfall, a perched water table is at a shallow depth for a short time. Construction of access roads, logging activities, and site preparation should be avoided in streambeds and adjacent areas to reduce the hazard of erosion. Tree limbs and tops should be kept clear of the stream channel because they can block streamflow.

Site preparation, such as roller chopping, burning, herbicide application, and bedding, can reduce the amount of debris, control immediate plant competition, and facilitate mechanical planting. Chopping should be done late in the fall or in the winter. Frequently, chopping only destroys the aboveground growth, and hardwood root systems sprout profusely in spring and summer. Repeated chopping is needed to destroy the sprouts in dense stands of hardwoods. The amount of hardwood understory can be reduced by controlled burning, applications of herbicide, or girdling or cutting of the unwanted trees. A major management concern is the very low or low available water capacity of the soil, which causes severe seedling mortality and retards plant growth. The soil commonly is very low in organic matter content. Harvesting methods that remove all tree biomass from the site further reduce the fertility of the soil. Logging operations should leave residual biomass distributed over the site. Management practices should include selection of appropriate plants and applications of fertilizer during planting operations.

This soil is moderately suited to pasture. The main limitations are the very low available water capacity, droughtiness, and the very low fertility. The available water capacity limits the production of plants during extended dry periods. Deep-rooted plants, such as coastal bermudagrass and bahiagrass, are more drought tolerant if fertilizer and lime are added.

This soil is poorly suited to cultivated crops because of the very low fertility and the droughtiness.

This soil provides good habitat for deer, bobcats, skunks, opossums, raccoons, quail, turkeys, and birds, particularly warblers. It provides fair habitat for squirrels and poor habitat for doves. Wildlife in the urban areas consists mostly of songbirds. The areas of the soil that have been left in native vegetation provide good cover and escape routes for most wildlife.

This soil is moderately suited to urban development. The main limitations are the periodic wetness and droughtiness. If the density of housing is moderate or high, a community sewage system is needed to prevent the contamination of water supplies resulting from seepage. Septic tank absorption fields are mounded in most areas. Unless vegetation is established, erosion and sedimentation commonly are problems in some water management systems. Wind erosion is a problem in unvegetated areas and is especially severe in the spring.

Native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. Vegetation is difficult to establish because the soil is infertile, coarse textured, and droughty. The native trees consist of American holly, cabbage palm, common persimmon, live oak, longleaf pine, and slash pine. The native shrubs include American beautyberry, coontie, coralbean, partridge pea, pawpaw, saw palmetto, shining sumac, tarflower, and southern waxmyrtle. The herbaceous plants are blazingstar, Catesby lily, grassleaf goldaster, hibiscus, iris, meadow beauty, sunflower, and zephyr lily.

This soil is poorly suited to recreational development. The main limitation is the sandy texture of the surface layer. The loose sand makes walking difficult. A plant cover is difficult to establish and maintain, but it can be maintained by controlling heavy traffic and by irrigating. Vehicles are easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is IIIs, and the woodland ordination symbol is 5S.

5—Fripp fine sand, rolling. This gently rolling to hilly, excessively drained soil is on narrow, dunelike ridges along the Atlantic coast. It is subject to flooding on rare occasions during prolonged, high-intensity storms. The mapped areas range from about 3 to 300 acres. Slopes are smooth, convex, or concave and range from 5 to 20 percent.

In 99 percent of the areas mapped as Fripp fine sand, rolling, the Fripp soil makes up 94 to 100 percent of the map unit. Dissimilar soils make up 0 to 6 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is light brownish gray fine sand about 4 inches thick. The underlying material, to a depth of 80 inches or more, is very pale brown fine sand.

Included in this map unit are small areas of dissimilar soils. These are Kureb, Newhan, and Resota soils. Kureb and Resota soils are on broad, nearly level ridges. Newhan soils are between the Fripp soil and Beaches.

Permeability of this Fripp soil is rapid. The available water capacity is very low or low. The seasonal high water table is at a depth of about 72 to 80 inches or more during most of the year. The soil is very low in natural fertility.

The natural vegetation consists of live oak and water oak. The understory includes saw palmetto and yaupon. The most common grasses are seaoats and beachgrass.

This soil is very poorly suited to pine trees, pasture, and cultivated crops. Droughtiness and the very low fertility are the main limitations.

This soil provides good habitat for a variety of shorebirds, such as gulls and terns, for crustaceans, such as crabs and sea turtles, and for mammals, such as mice, raccoons, bobcats, foxes, and skunks. Many songbirds also inhabit areas of this soil. The native grasses and legumes provide a good food source and nesting sites. Wildlife in the urban areas consist mostly of songbirds, shorebirds, and crustaceans. The areas of this soil that have been left in native vegetation provide food, cover, and escape routes for most wildlife.

This soil is moderately suited to urban development. The main limitations are the slope and the droughtiness. Roads and streets should be constructed above the expected level of flooding. If the density of housing is moderate or high, a community sewage system is needed to prevent the contamination of water supplies resulting from seepage. The slope is a concern in installing septic tank absorption fields. Lateral lines should be installed on the contour. Designing access roads so that they have adequate cut-slope grades and installing drains help to control surface runoff and keep soil losses to a minimum. Areas adjacent to the ocean are subject to coastal dune erosion, especially if construction alters the natural processes and destroys excessive amounts of native vegetation. Vegetation is difficult to establish because the soil is infertile, coarse textured, excessively drained, and saline and because of the salt spray. Intensive management practices, including irrigation, are needed to establish and maintain vegetation on this soil. Unless vegetation is established, water and wind erosion can become a problem during and after construction.

Native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of cabbage palm, Chickasaw plum, live oak, redbay, red cedar, slash pine, magnolia, and sand pine. The native shrubs include beargrass, pricklypear cactus, coontie, coralbean, yaupon, lantana, marshelder, partridge pea, saw palmetto, Spanish bayonet, and waxmyrtle. The most common grasses are seaoats, marshhay cordgrass, bitter panicum, seashore saltgrass, gulf bluestem, seashore paspalum, seashore dropseed, common bermudagrass, and shoredune panicum. The herbaceous plants and vines are beach morningglory, fiddler-leaf morningglory, blanketflower, largeleaf pennywort, sea purslane, greenbrier, and wild grape.

This soil is poorly suited to recreational development. The main limitations are the slope and the sandy texture of the surface layer. The loose sand makes walking difficult. Because of the slope, recreation areas on this soil are limited to a few paths and trails, which should extend across the slope. A plant cover is difficult to establish and maintain, but it can be maintained by controlling heavy traffic and by irrigating. Vehicles are very easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is VIIs. This soil has not been assigned a woodland ordination symbol.

6—Hurricane-Pottsburg fine sands, 0 to 5 percent slopes. These nearly level and gently sloping, somewhat poorly drained and poorly drained soils are on narrow to broad ridges and on isolated knolls interspersed with flatwoods. The mapped areas range from about 3 to 150 acres. Slopes are smooth or concave.

In 97 percent of the areas mapped as Hurricane-Pottsburg fine sands, 0 to 5 percent slopes, Hurricane, Pottsburg, and similar soils make up 88 to 93 percent of the map unit. Dissimilar soils make up 7 to 12 percent. They generally are in areas less than 3 acres in size.

Generally, the mapped areas are about 50 percent Hurricane and similar soils, 39 percent Pottsburg soils, and 11 percent dissimilar soils. The soils in this map unit are so intermingled that it is not practical to map them separately at the scale used. The proportions and patterns of the Hurricane, Pottsburg, and similar soils, however, are relatively consistent in most areas.

The Hurricane soil is nearly level and gently sloping and is somewhat poorly drained. Typically, the surface layer is grayish brown fine sand about 5 inches thick. The subsurface layer is fine sand. It extends to a depth of about 68 inches. It is yellowish brown in the upper part, light yellowish brown in the next part, and light gray in the lower part. The subsoil, to a depth of 80 inches or more, is fine sand. It is dark brown in the upper part and dark reddish brown in the lower part. Some soils occurring in areas of this map unit are similar to the Hurricane soil but have a black and very dark gray surface layer about 10 to 30 inches thick. These soils are near the communities of Hedges and Crandall.

The Pottsburg soil is nearly level and is poorly drained. Typically, the surface layer is very dark gray fine sand about 8 inches thick. The subsurface layer, to a depth of about 55 inches, is fine sand. It is brown and dark gray in the upper part and gray in the lower part. The subsoil, to a depth of 80 inches or more, is dark reddish brown fine sand.

Included in this map unit are small areas of dissimilar soils. These are Boulogne, Leon, Mandarin, Resota, and Ridgewood soils. Boulogne, Leon, and Mandarin soils are on flatwoods. Resota and Ridgewood soils are on the slightly higher ridges.

The Hurricane soil has a seasonal high water table at a depth of 24 to 42 inches for 2 to 6 months of the year. Permeability is rapid in the upper part of the soil and moderately rapid in the lower part. The available water capacity is very low or low in the surface and subsurface layers and moderate in the subsoil. The content of organic matter and natural fertility are low.

The Pottsburg soil has a seasonal high water table at a depth of 12 to 24 inches for 1 to 4 months of the year. The water table may rise to within 6 inches of the surface for brief periods after heavy rainfall. Permeability is rapid in the upper part of the soil and moderate in the lower part. The available water capacity is very low or low in the surface and subsurface layers and moderate in the subsoil. The content of organic matter and natural fertility are low.

These soils are used mainly as woodland. In a few areas they are used for pasture or crops.

The natural vegetation consists of longleaf pine, slash pine, turkey oak, and live oak. The understory includes gallberry, pineland threeawn, bluestem, hairy panicum, lovegrass, and broom sedge.

These soils are well suited to slash pine and loblolly pine and are moderately suited to longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine and loblolly pine is 60 to 65 feet. The potential production is 28 to 34 cords per acre for slash pine and 36 to 42 cords per acre for loblolly pine based on a 25-year rotation *(7)*. The average site index for longleaf pine is 70 to 75 feet. The estimated potential production is 43 to 49 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are seedling mortality, the equipment limitation, and plant competition. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting operations during dry periods can help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations. Construction of access roads, logging activities, and site preparation should be avoided in streambeds and adjacent areas because of the hazard of erosion. Tree limbs and tops should be kept clear of the stream channel because they can block streamflow. Stream crossing should be avoided if possible. Culverts and bridges may be needed.

Site preparation, such as roller chopping, burning, applications of herbicide, and bedding, can reduce the amount of debris, control immediate plant competition, and facilitate mechanical planting. Special site preparation, such as harrowing and bedding, can help to establish seedlings, reduce the seedling mortality rate, and increase the early growth rate. Bedding should be planned so that it does not impair natural surface drainage. Conventional harvesting methods generally are suitable. If heavy equipment is used during wet periods, the extent of soil compaction will increase. Management practices should include selection of appropriate plants and applications of fertilizer during planting operations. These soils commonly are low in organic matter content, and harvesting methods that remove all tree biomass from the site can reduce the fertility of these soils. Logging operations should leave residual biomass distributed over the site.

Because of droughtiness and the low fertility, the Hurricane soil is only moderately well suited to pasture. The Pottsburg soil is well suited. The best suited pasture plants are coastal bermudagrass and bahiagrass.

The Hurricane soil is poorly suited to cultivated crops, and the Pottsburg soil is very poorly suited. The main limitations are the periodic wetness and droughtiness and the low fertility. If water-control and soil-improving measures are applied, these soils are moderately well suited to most cultivated crops. The main crops are corn and grain sorghum. These soils are friable, are easy to keep in good tilth, and can be worked throughout a wide range of moisture content. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture can help to conserve moisture, maintain fertility, and control erosion. Frequent applications of fertilizer and lime generally are needed.

These soils provide good habitat for deer and turkey. Many birds inhabit the area, including warblers, towhees, crested flycatchers, dove, and quail. Several varieties of native legumes provide food for the birds. The harvesting of timber and similar disturbances improve wildlife food values by increasing the amount, availability, and types of herbaceous plants and by producing new sprouts. The areas of these soils that have been left in native vegetation provide good cover, food, and travel and escape routes for most wildlife.

If these soils are used for urban development, the main limitations are the periodic wetness and droughtiness. Septic tank absorption fields should be mounded. Establishing vegetation commonly is difficult because the soils are infertile, coarse textured, and somewhat poorly drained or poorly drained. Intensive management practices are needed to establish vegetation on these soils, and irrigation is required for the best results during dry periods. Adequate applications of fertilizer are needed. Unless vegetation is established, wind erosion can become a problem during and after construction.

Native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of American holly, Chickasaw plum, longleaf pine, slash pine, live oak, southern redcedar, sand pine, turkey oak, bluejack oak, and Florida chinkapin. The native shrubs include adam's needle, American beautyberry, Carolina holly, coontie, coralbean, pawpaw, pricklypear cactus, saw palmetto, shining sumac, and yaupon. The herbaceous plants include aster, beebalm, crotalaria, blanketflower, blazingstar, goldaster, lupine, morningglory, goldenrod, and sunflower.

These soils are poorly suited to recreational development. The main limitations are the wetness and the sandy texture of the surface layer. The loose sand makes walking difficult. A plant cover is somewhat difficult to establish and maintain, but it can be maintained by controlling heavy traffic and by irrigating. Vehicles are easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is IIIw. The woodland ordination symbol is 11W in areas of the Hurricane soil and 8W in areas of the Pottsburg soil.

7—Kingsland mucky peat, frequently flooded. This nearly level, very poorly drained soil is on the flood plains along the tributaries and major streams that are influenced by tidal action. It is frequently flooded for very long periods in most years. The mapped areas range from about 5 to 250 acres. Slopes are smooth or concave and are 0 to 2 percent.

In 92 percent of the areas mapped as Kingsland mucky peat, frequently flooded, Kingsland and similar soils make up 77 to 100 percent of the map unit. Dissimilar soils make up 0 to 23 percent. They generally are in areas less than 5 acres in size.

Typically, the surface layer is black mucky peat about 12 inches thick. It is underlain by black mucky peat to a depth of 80 inches or more. Soils occurring in areas of this map unit that are similar to the Kingsland soil are Maurepas soils and some soils that have a loamy substratum at a depth of 40 inches or more.

Included in this map unit are small areas of dissimilar soils. These are Ousley and Tisonia soils. Ousley soils are higher on the landscape than the Kingsland soil. Tisonia soils are in tidal areas.

Permeability of this Kingsland soil is rapid. The available water capacity is very high. The seasonal high water table is near or at the surface during most of the year. The soil is high in natural fertility.

This soil is used mainly as woodland. The natural vegetation consists of water tupelo, sweetgum, bay, baldcypress, and pond pine. The understory includes greenbrier, fetterbush lyonia, aster, and willow.

The potential of this soil for the production of baldcypress and pond pine is high. The main concerns in producing and harvesting timber are the very severe seedling mortality and the equipment limitation, both of which are caused by wetness. Overcoming the wetness is very difficult. The trees selected for planting should be those that are water tolerant. Planting and harvesting should be scheduled during extended dry periods. If nursery stock is used to establish or improve a stand, hand planting generally is necessary. Management practices should include selection of appropriate plants.

This soil is very poorly suited to pasture, cultivated crops, and urban or recreational development because of the wetness and the flooding.

This soil provides good habitat for a large variety of wildlife, especially for waterfowl, reptiles, and amphibians, and for mammals, such as gray squirrels, minks, raccoons, and river otters. Many birds inhabit the area, including the chickadee, titmouse, yellow-billed cuckoo, wood duck, limpkin, acadian flycatcher, owl, woodcock, hooded warbler, cedar waxwing, woodpecker, and wren. The various hardwoods provide a good source of food and cover for these wildlife species.

The land capability classification is VIIw. This soil has not been assigned a woodland ordination symbol.

8—Kureb fine sand, 0 to 5 percent slopes. This nearly level and gently sloping, excessively drained soil is on broad upland ridges. The mapped areas range from about 3 to 50 acres. Slopes are smooth.

In 93 percent of the areas mapped as Kureb fine sand, 0 to 5 percent slopes, Kureb and similar soils make up 84 to 100 percent of the map unit. Dissimilar soils make up 0 to 16 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is gray fine sand about 5 inches thick. The subsurface layer, to a depth of about 19 inches, is light brownish gray fine sand. The underlying material, to a depth of 80 inches or more, is fine sand. To a depth of about 30 inches, it is strong brown and has light gray tongues. Below that depth, it is yellowish brown, brownish yellow, yellow, and very pale brown. Kershaw soils, which are similar to the Kureb soil, are in areas of this map unit.

Included in this map unit are small areas of dissimilar soils. These are Resota soils, which are on the lower ridges.

Permeability of this Kureb soil is rapid. The available water capacity is very low. The seasonal high water table is at a depth of about 72 to 80 inches or more during most of the year. The soil is very low in natural fertility.

This soil is used mainly for urban development.

The natural vegetation consists of live oak and water oak. The understory includes saw palmetto and yaupon. The most common grasses are pineland threeawn and pinehill, little, and slender bluestems.

This soil is moderately suited to longleaf pine and sand pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site index is 40 feet for longleaf pine and 70 feet for sand pine. The estimated potential production is 10 cords per acre for longleaf pine and 30 cords per acre for sand pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are seedling mortality and the equipment limitation. Using tracks or floatation tires on planting and harvesting machinery and scheduling planting and harvesting operations during dry periods can help to overcome the equipment limitation. Hardwood understory can be reduced by controlled burning, applications of herbicide, or girdling or cutting of the unwanted trees. A major management concern is the very low available water capacity, which causes severe seedling mortality and retards plant growth. Planting special nursery stock that is larger than usual or that is containerized can reduce the seedling mortality rate. Natural regeneration may be preferable in the drier areas. Management practices should include selecting appropriate plants and leaving debris on the site. The soil commonly is very low in organic matter content. Harvesting methods that remove all tree biomass from the site further reduce the fertility of the soil. Logging operations should leave residual biomass distributed over the site.

This soil is very poorly suited to pasture and to cultivated crops because of droughtiness and the very low fertility.

This soil provides habitat for deer and turkeys. Many birds inhabit the area, including warblers, rufous-sided towhees, great crested flycatchers, scrub jays, and quail. Several varieties of native legumes furnish food for the birds. Palmettos, gopher apple, and various oaks provide a good source of wildlife food when they are bearing fruit. The harvesting of timber and other disturbances improve wildlife food values by increasing the amount, availability, and types of herbaceous plants and by producing new sprouts. Wildlife in the urban areas consists mostly of birds, but gopher tortoises, sand skinks, scrub lizards, and snakes also inhabit these areas. The areas of this soil that have been left in native vegetation provide good cover and escape routes for most wildlife.

This soil is moderately suited to urban development. The main limitation is droughtiness. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of water supplies resulting from seepage. Vegetation is difficult to establish because the soil is infertile, coarse textured, and droughty. Water moves rapidly through the soil. Intensive management practices, including irrigation, are needed to establish and maintain vegetation on this soil. Unless vegetation is established, wind erosion can be a problem during and after construction. Erosion-control and water-retention facilities generally are not needed.

Native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of live oak, sand live oak, sand pine, turkey oak, and eastern redcedar. The native shrubs include adam's needle, coralbean, Carolina holly, gopher apple, pawpaw, pricklypear cactus, rosemary, saw palmetto, and shining sumac. Some of the herbaceous plants are aster, beebalm, crotalaria, blanketflower, blazingstar, goldaster, goldenrod, lupine, morningglory, and sunflower.

This soil is poorly suited to recreational development. The main limitation is the sandy texture of the surface layer. The loose sand makes walking difficult. A plant cover is difficult to establish and maintain, but it can be maintained by controlling heavy traffic and by irrigating. Vehicles are easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is VIIs, and the woodland ordination symbol is 3S.

9—Leon fine sand. This nearly level, poorly drained soil is on flatwoods. The mapped areas range from about 3 to 75 acres. Slopes are smooth and are 0 to 2 percent.

In 94 percent of the areas mapped as Leon fine sand, Leon and similar soils make up 89 to 98 percent of the map unit. Dissimilar soils make up 2 to 11 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is very dark gray fine sand about 7 inches thick. The subsurface layer, to a depth of about 18 inches, is gray fine sand. The subsoil, to a depth of about 31 inches, is black and dark reddish brown fine sand. Separating the upper and lower parts of the subsoil, to a depth of about 37 inches, is a buried subsurface layer of yellowish brown fine sand. The lower part of the subsoil, to a depth of 80 inches or more, is dark brown and black fine sand. Soils occurring in areas of this map unit that are similar to the Leon soil are Boulogne soils and some soils that have a black or very dark gray surface layer 8 to more than 10 inches thick. The thickness of the surface layer is caused by forestry bedding practices. There are also similar soils that have thin layers of loamy fine sand directly above the lower part of the subsoil.

Included in this map unit are small areas of dissimilar soils. These are Kingsferry, Pottsburg, Ridgewood, Sapelo, and Wesconnett soils. Sapelo soils are in positions on the landscape similar to those of the Leon soil. Kingsferry soils are lower on flatwoods than the Leon soil. Pottsburg and Ridgewood soils are on ridges and knolls. Wesconnett soils are in depressions.

Permeability of this Leon soil is rapid in the surface, subsurface, and buried subsurface layers and moderate or moderately rapid in the subsoil. The available water capacity is very low in the surface, subsurface, and buried subsurface layers and low in the subsoil. The seasonal high water table is at a depth of 6 to 18 inches for 1 to 4 months during periods of heavy rainfall and at a depth of 12 to 42 inches for 2 to 8 months of the year. The soil is very low in natural fertility. Root penetration is obstructed by the subsoil.

This soil is used mainly as woodland. It is also used for urban development.

The natural vegetation consists of slash pine and longleaf pine. The understory includes saw palmetto and gallberry. The most common grasses are pineland threeawn, creeping and chalky bluestems, hairy panicum, and lopsided indiangrass.

This soil is moderately suited to slash pine, loblolly pine, and longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine and loblolly pine is 55 feet. The potential production is 23 cords per acre for slash pine and 31 cords per acre for loblolly pine *(7)* based on a 25-year rotation. The average site index for longleaf pine is 65 feet. The estimated potential production is 36 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are the equipment limitation and seedling mortality. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during dry periods can help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations. Construction of access roads, logging activities, and site preparation should be avoided in streambeds and adjacent areas because of the hazard of erosion. Tree limbs and tops should be kept clear of the stream channel because they can block streamflow.

Site preparation, such as roller chopping, burning, applications of herbicide, and bedding, can reduce the amount of debris, control immediate plant competition, and facilitate mechanical planting. Special site preparation, such as harrowing and bedding, can help to establish seedlings, reduce the seedling mortality rate, and increase the early growth rate. Bedding should be planned so that it does not impair natural surface drainage. Short-term drainage is needed on the wet sites until the pine's uptake of water lowers the water table, at which time the drains should be blocked. A major management concern is the low available water capacity, which causes severe seedling mortality and retards plant growth. Management practices should include selection of appropriate plants. The soil commonly is very low in organic matter content. Harvesting methods that remove all tree biomass from the site further reduce the fertility of the soil. Logging operations should leave residual biomass distributed over the site.

This soil is well suited to pasture. The main limitations are the periodic wetness and the very low fertility. Coastal bermudagrass, bahiagrass, and legumes are the best suited pasture plants. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is very poorly suited to cultivated crops. The main limitations are the periodic wetness and droughtiness and the very low fertility. Corn and grain sorghum are the best suited crops to plant. Proper row arrangement, field ditches, and vegetated outlets help to remove excess surface water. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer and lime generally are needed.

This soil provides good habitat for deer, bobcats, skunks, opossums, raccoons, quail, and turkeys and for many birds, particularly warblers. It provides fair habitat for squirrels and poor habitat for doves. Wildlife in the urban areas consists mostly of birds. The areas of this soil that have been left in native vegetation provide good cover and escape routes for most wildlife.

This soil is poorly suited to urban development. The main limitation is the wetness. Drainage is needed if roads and building foundations are constructed. The wetness can be reduced by installing tile drains around the footings. Housing development plans should provide for the preservation of as many trees as possible. Vegetation is difficult to establish because the soil is infertile, coarse textured, and droughty. Mulch, fertilizer, and irrigation help to establish lawn grasses and other small seeded plants. Drainage is needed for the best results with most lawn grasses, shade trees, ornamental trees, shrubs, vines, and vegetable gardens. Septic tank absorption fields are mounded in most areas. The moderate permeability can be overcome by increasing the size of the absorption field. Unless vegetation is established, erosion and sedimentation commonly are problems in some water management systems. Wind erosion is a problem in unvegetated areas and is especially severe in the spring.

Native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of American holly, cabbage palm, common persimmon, live oak, longleaf pine, and slash pine. The native shrubs include American beautyberry, coontie, coralbean, partridge pea, pawpaw, saw palmetto, shining sumac, tarflower, and southern waxmyrtle. The herbaceous plants are blazingstar, Catesby lily, grassleaf goldaster, hibiscus, iris, meadow beauty, sunflower, and zephyr lily.

This soil is poorly suited to recreational development. The main limitations are the wetness and the sandy texture of the surface layer. The loose sand makes walking difficult. Good drainage should be provided for paths and trails.

The land capability classification is IVw, and the woodland ordination symbol is 8W.

10—Mandarin fine sand. This nearly level, somewhat poorly drained soil is on narrow to broad ridges. The mapped areas range from about 3 to 100 acres. Slopes are smooth to slightly convex and are 0 to 2 percent.

In 84 percent of the areas mapped as Mandarin fine sand, Mandarin soils make up 76 to 93 percent of the map unit. Dissimilar soils make up 7 to 24 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is very dark gray fine sand about 6 inches thick. The subsurface layer, to a depth of about 20 inches, is gray and light gray fine sand. The subsoil, to a depth of about 59 inches, is dark reddish brown fine sand in the upper part and yellowish brown fine sand in the lower part. The substratum, to a depth of 80 inches or more, is white fine sand.

Included in this map unit are small areas of dissimilar soils. These are Echaw, Hurricane, Leon, and Resota soils. Echaw soils are on the slightly higher ridges. Hurricane and Resota soils are on ridges. Leon soils are on low flatwoods.

Permeability of this Mandarin soil is rapid in the surface and subsurface layers and moderate in the subsoil. The available water capacity is very low or low in the surface and subsurface layers and moderate in the subsoil. The seasonal high water table is at a depth of 18 to 42 inches for 4 to 6 months of the year. It is at a depth of 12 to 18 inches during periods of heavy rainfall. The soil is very low in natural fertility.

In most areas this soil is used as woodland. In a few areas it is used for urban development.

The natural vegetation consists of slash pine, longleaf pine, water oak, and live oak. The understory includes saw palmetto and fetterbush lyonia. The most common grasses are pineland threeawn, creeping bluestem, lopsided indiangrass, panicum, and paspalum.

This soil is moderately suited to slash pine and loblolly pine and is poorly suited to longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine and loblolly pine is 55 feet. The potential production is 23 cords per acre for slash pine and 31 cords per acre for loblolly pine *(7)* based on a 25-year rotation. The average site index for longleaf pine is 60 feet. The estimated potential production is 30 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are seedling mortality, the equipment limitation, and plant competition. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during dry periods can help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations. Construction of access roads, logging activities, and site preparation should be avoided in streambeds and adjacent areas because of the hazard of erosion. Tree limbs and tops should be kept clear of the stream channel because they can block streamflow.

Site preparation, such as roller chopping, burning, applications of herbicide, and bedding, can reduce the amount of debris, control immediate plant competition, and facilitate mechanical planting. Chopping should be done late in the fall or in the winter. Frequently, chopping only destroys the aboveground growth, and hardwood root systems sprout profusely in spring and summer. Repeated chopping is needed to destroy the sprouts in dense stands of hardwoods. The amount of hardwood understory can be reduced by controlled burning, applications of herbicide, or girdling or cutting of the unwanted trees. Special site preparation, such as harrowing and bedding, can help to establish seedlings, reduce the seedling mortality rate, and increase the early growth rate. A major management concern is the low available water capacity, which causes severe seedling mortality and retards plant growth. The soil commonly is very low in organic matter content. Harvesting methods that remove all tree biomass from the site further reduce the fertility of the soil. Logging operations should leave residual biomass distributed over the site. Management practices include selection of appropriate plants and applications of fertilizer during planting operations.

This soil is moderately suited to pasture. The main limitations are periodic droughtiness and the very low fertility. The very low available water capacity of the soil is a limitation affecting plant growth during extended dry periods. Deep-rooted plants, such as coastal bermudagrass and bahiagrass, are more drought tolerant if fertilizer and lime are added. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is very poorly suited to cultivated crops because of droughtiness and the very low fertility.

This soil provides good habitat for deer, bobcat, skunks, opossums, raccoons, quail, and turkeys and for many birds, particularly warblers. It provides fair habitat for squirrels. Wildlife in the urban areas consists mostly of birds. The areas of this soil that have been left in native vegetation provide good food, cover, and escape routes for most wildlife.

This soil is poorly suited to urban development. The main limitations are the seasonal high water table and the droughtiness. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of water supplies resulting from seepage. Unless vegetation is established, erosion and sedimentation commonly are problems in some water management systems. Wind erosion is a problem in unvegetated areas and is especially severe in the spring.

Housing development plans should provide for the preservation of as many trees as possible. Mulching and fertilizing cut areas help to establish plants. Selection of suitable vegetation is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. Native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of American holly, cabbage palm, common persimmon, live oak, longleaf pine, and slash pine. The native shrubs include American beautyberry, coontie, coralbean, partridge pea, pawpaw, saw palmetto, shining sumac, tarflower, and southern waxmyrtle. The herbaceous plants are blazingstar, Catesby lily, grassleaf goldaster, hibiscus, iris, meadow beauty, sunflower, and zephyr lily.

This soil is poorly suited to recreational development. The main limitation is the sandy texture of the surface layer. The loose sand makes walking difficult. A plant cover is somewhat difficult to establish and maintain, but it can be maintained by controlling heavy traffic and by irrigating. Vehicles are easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is VIs, and the woodland ordination symbol is 8S.

11—Chaires fine sand. This nearly level, poorly drained soil is on broad flatwoods. The mapped areas range from about 3 to 60 acres. Slopes are smooth and are 0 to 2 percent.

In 91 percent of the areas mapped as Chaires fine sand, Chaires and similar soils make up 86 to 96 percent of the map unit. Dissimilar soils make up 4 to 14 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is black fine sand about 7 inches thick. The subsurface layer, to a depth of about 18 inches, is gray fine sand. The subsoil, to a depth of 80 inches or more, is, in sequence downward, black fine sand, dark reddish brown fine sand, yellowish brown fine sand, light brownish gray sandy clay loam, light gray sandy clay loam, and light brownish gray fine sandy loam. Sapelo soils, which are similar to the Chaires soil, are in areas of this map unit.

Included in this map unit are small areas of dissimilar soils. These are Ocilla, Goldhead, Meadowbrook, and Meggett soils. Ocilla soils are on slightly elevated ridges. Goldhead and Meadowbrook soils are in depressions, in sloughs, and on low flats. Meggett soils are in sloughs and on low flats. Also included are soils that have a dark subsoil immediately below the surface layer.

Permeability of this Chaires soil is rapid in the surface, subsurface, and buried subsurface layers, moderate in the upper part of the subsoil, and moderately slow in the lower part. The available water capacity is very low or low in the surface and subsurface layers and moderate in the subsoil. The seasonal high water table is at a depth of 6 to 18 inches for 1 to 4 months of the year. The soil is very low or low in natural fertility.

This soil is used mainly as woodland. The natural vegetation consists of slash pine, longleaf pine, and water oak. The understory includes saw palmetto, gallberry, pineland threeawn, creeping bluestem, chalky bluestem, hairy panicum, and lopsided indiangrass.

This soil is moderately suited to slash pine, loblolly pine, and longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine and loblolly pine is 60 feet. The potential production is 28 cords per acre for slash pine and 36 cords per acre for loblolly pine *(7)* based on a 25-year rotation. The average site index for longleaf pine is 70 feet. The estimated potential production is 43 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are the equipment limitation and seedling mortality. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during dry periods help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations. Construction of access roads, logging activities, and site preparation should be avoided in streambeds and adjacent areas because of the hazard of erosion. Tree limbs and tops should be kept clear of the stream channel because they can block streamflow.

Site preparation, such as roller chopping, burning, applications of herbicide, and bedding, can reduce the amount of debris, control immediate plant competition, and facilitate mechanical planting. Special site preparation, such as harrowing and bedding, can help to establish seedlings, reduce the seedling mortality rate, and increase the early growth rate. Bedding should be planned so that it does not impair natural surface drainage. Short-term drainage is needed on some of the wet sites until the pine's uptake of water lowers the water table, at which time the drains should be blocked. A major management concern is the low available water capacity, which causes severe seedling mortality and retards plant growth. Management practices should include selection of appropriate plants and applications of fertilizer during planting operations. The soil commonly is very low in organic matter content. Harvesting methods that remove all tree biomass from the site can further reduce the fertility of the soil. Logging operations should leave residual biomass distributed over the site.

This soil is moderately well suited to pasture. The main limitations are the periodic wetness and droughtiness and the low fertility. The wetness limits the choice of plants that can be grown and the period of grazing. When the soil is wet, grazing causes compaction of the surface layer and damage to the plant community. The low available water capacity is a limitation affecting the growth of plants suitable for pasture. Drought-tolerant plants, such as bahiagrass, coastal bermudagrass, and legumes, are the best suited pasture plants. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is poorly suited to cultivated crops. The wetness, the low fertility, the droughtiness, and the low available water capacity are the main limitations. Corn and grain sorghum are the best suited crops to plant. Proper row arrangement, field ditches, and vegetated outlets help to remove excess surface water. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer and lime generally are needed.

This soil provides very good habitat for deer, quail, bobcats, skunks, opossums, raccoons, and turkeys and for many birds, particularly warblers. It provides fair habitat for squirrels and poor habitat for doves. Wildlife in the urban areas consists mostly of birds. The areas of this soil that have been left in native vegetation provide good cover and escape and travel routes for most wildlife.

This soil is poorly suited to urban development. The main limitation is the periodic wetness. Drainage is needed if roads and building foundations are constructed. The wetness can be reduced by installing tile drains around the footings. If the density of housing is moderate or high, a community sewage system is needed to prevent the contamination of water supplies resulting from seepage. Septic tank absorption fields are mounded in most areas. Unless vegetation is established, erosion and sedimentation commonly are problems in some water management systems. Wind erosion is a problem in unvegetated areas and is especially severe in the spring.

Housing development plans should provide for the preservation of as many trees as possible. Mulch, fertilizer, and irrigation help to establish lawn grasses and other small seeded plants. Drainage is needed for most lawn grasses, shade trees, ornamental trees, shrubs, vines, and vegetable gardens. Native plants should be used for landscaping and beautification because they are more easily established and require less maintenance than other plants. The native trees consist of American holly, cabbage palm, common persimmon, live oak, longleaf pine, and slash pine. The native shrubs include American beautyberry, coontie, coralbean, partridge pea, pawpaw, saw palmetto, shining sumac, tarflower, and southern waxmyrtle. The herbaceous plants are blazingstar, Catesby lily, grassleaf goldaster, hibiscus, iris, meadow beauty, sunflower, and zephyr lily.

This soil is poorly suited to recreational development. The main limitations are the periodic wetness and the sandy texture of the surface layer. The loose sand makes walking difficult. Good drainage is needed for paths and trails. Vehicles are easily mired down, and soil blowing occurs if the surface is bare.

The land capability classification is IVw, and the woodland ordination symbol is 10W.

12—Newhan-Corolla, rarely flooded, fine sands, rolling. These gently rolling to hilly, excessively drained, moderately well drained, and somewhat poorly drained soils are on narrow, dunelike ridges along the Atlantic coast. The Corolla soil is subject to flooding on rare occasions during prolonged, high-intensity storms. The mapped areas range from about 5 to 300 acres. Slopes are convex or concave and range from 2 to 20 percent.

In 100 percent of the areas mapped as Newhan-Corolla, rarely flooded, fine sands, rolling, Newhan and Corolla soils make up 98 to 100 percent of the map unit. Dissimilar soils make up 0 to 2 percent. They generally are in areas less than 3 acres in size.

Generally, the mapped areas are about 77 percent Newhan soils, 21 percent Corolla soils, and 2 percent dissimilar soils. The soils in this map unit are so intermingled that mapping them separately is not practical at the scale used. The proportions and patterns of the Newhan and Corolla soils, however, are relatively consistent in most areas.

The Newhan soil is excessively drained. It is at the higher elevations and has slopes that range from 5 to 20 percent. Typically, the surface layer is white fine sand about 8 inches thick. The underlying material, to a depth of about 80 inches, is very pale brown fine sand.

The Corolla soil is moderately well drained and somewhat poorly drained. It is in low positions on the landscape and has slopes of less than 6 percent. Typically, the surface layer is very pale brown fine sand about 6 inches thick. The underlying material, to a depth of about 80 inches, is fine sand. It is pale brown and light yellowish brown in the upper part and light gray in the lower part.

Included in this map unit are small areas of dissimilar soils. These are Fripp soils and Beaches. Fripp soils are in the western part of the areas.

The Newhan soil has a seasonal high water table at a depth of more than 72 inches during most years. The Corolla soil has a seasonal high water table at a depth of 18 to 36 inches for 2 to 6 months and at a depth of more than 36 inches for the rest of the year. The permeability of the Newhan and Corolla soils is very rapid. The available water capacity is very low. These soils are very low in natural fertility.

These soils are used mainly for urban development.

The natural vegetation consists of yaupon and live oak. The most common grasses are seaoats and bushy bluestem.

These soils are not suited to pine trees, to pasture, or to cultivated crops because of salt spray.

These soils provide very good habitat for a variety of songbirds; for shorebirds, such as gulls and terns; and for crustaceans, such as crabs and sea turtles. They also provide good habitat for mammals, such as mice, raccoons, bobcats, foxes, and skunks. The native grasses and legumes provide good food sources and nesting sites. The areas of these soils that have been left in native vegetation provide good cover and escape routes for most wildlife.

These soils are moderately well suited to urban development. The main limitations are the slope and droughtiness. Roads and streets should be constructed above the expected level of flooding. If the density of housing is moderate or high, a community sewage system is needed to prevent the contamination of water supplies resulting from seepage. The slope is a concern in installing septic tank absorption fields. Lateral lines should be installed on the contour. Designing access roads so that they have adequate cut-slope grades and installing drains help to control surface runoff and keep soil losses to a minimum. Areas adjacent to the ocean are subject to coastal dune erosion, especially if construction alters the natural processes and destroys excessive amounts of native vegetation. Vegetation is difficult to establish because the soil is infertile, coarse textured, excessively drained, and saline and because of the salt spray. Intensive management practices, including irrigation, are needed to establish and maintain vegetation on these soils. Unless vegetation is established, water and wind erosion can be a problem during and after construction.

Native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of cabbage palm, Chickasaw plum, live oak, redbay, red cedar, slash pine, magnolia, and sand pine. The native shrubs include beargrass, pricklypear cactus, coontie, coralbean, yaupon, lantana, marshelder, partridge pea, saw palmetto, Spanish bayonet, and waxmyrtle. The most common grasses are seaoats, marshhay cordgrass, bitter panicum, seashore saltgrass, gulf bluestem, seashore paspalum, seashore dropseed, common bermudagrass, and shoredune panicum. The herbaceous plants and vines are beach morningglory, fiddler-leaf morningglory, blanketflower, largeleaf pennywort, sea purslane, greenbrier, and wild grape.

These soils are poorly suited to recreational development. The main limitations are the slope and the sandy texture of the surface layer. The loose sand makes walking difficult. Because of the slope, recreation areas on these soils are limited to paths and trails, which should extend across the slope. A plant cover is difficult to establish and maintain, but it can be maintained by controlling heavy traffic and by irrigating. Vehicles are easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is VIIIs. These soils have not been assigned a woodland ordination symbol.

13—Goldhead fine sand. This nearly level, poorly drained soil is on broad, low flats and in sloughs. The mapped areas range from about 3 to 150 acres. Slopes are smooth or convex and are 0 to 2 percent.

In 93 percent of the areas mapped as Goldhead fine sand, Goldhead and similar soils make up 90 to 96 percent of the map unit. Dissimilar soils make up 4 to 10 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is black fine sand about 8 inches thick. The subsurface layer, to a depth of about 33 inches, is fine sand. The upper part is dark gray, and the lower part is gray. The subsoil, to a depth of about 69 inches, is olive gray clay loam. The substratum, to a depth of 80 inches or more, is greenish gray loamy fine sand. Soils occurring in areas of this map unit that are similar to the Goldhead soil are Meadowbrook soils and some soils that have a black and very dark gray surface layer more than 8 inches thick. The dark color of the surface layer is caused by forestry bedding practices. Also, there are similar soils that have a subsoil within 20 inches of the surface or a dark subsoil directly below the surface layer.

Included in this map unit are small areas of dissimilar soils. These are Blanton, Ellabelle, Leefield, Chaires, Meggett, and Ocilla soils. Blanton soils are on elevated ridges. Ellabelle soils are in drainageways. Leefield and Ocilla soils are on slightly higher elevations than the Goldhead soils. Chaires soils are on flatwoods. Meggett soils are on broad, low flats and in sloughs and depressions.

Permeability of this Goldhead soil is rapid in the surface and subsurface layers and moderately slow in the subsoil. The available water capacity is low in the surface and subsurface layers and moderate in the subsoil. The seasonal high water table is within 12 inches of the surface for 3 to 6 months of the year. The surface layer remains wet for long periods after heavy rainfall. The soil is low in natural fertility.

In most areas this soil is used as woodland. In a few areas it is used for pasture or crops.

The natural vegetation consists of slash pine, loblolly pine, longleaf pine, sweetgum, blackgum, and water oak. The understory includes briers, gallberry, waxmyrtle, and a few saw palmettos. The most common native grasses are pineland threeawn, pinehill bluestem, little bluestem, panicum, toothachegrass, muhly, and switchgrass.

This soil is well suited to slash pine and loblolly pine and is moderately suited to longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine and loblolly pine is 65 feet. The potential production is 34 cords per acre for slash pine and 42 cords per acre for loblolly pine *(7)* based on a 25-year rotation. The average site index for longleaf pine is 75 feet. The estimated potential production is 39 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are seedling mortality and the equipment limitation. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during dry periods can help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations. Construction of access roads, logging activities, and site preparation should be avoided in streambeds and adjacent areas because of the hazard of erosion. Tree limbs and tops should be kept clear of the stream channel because they can block streamflow.

Site preparation, such as roller chopping, burning, applications of herbicide, and bedding, can reduce the amount of debris, control immediate plant competition, and facilitate mechanical planting. Special site preparation, such as harrowing and bedding, can help to establish seedlings, reduce the seedling mortality rate, and increase the early growth rate. Bedding should be planned so that it does not impair natural surface drainage. Short-term drainage is needed on some of the wet sites until the pine's uptake of water lowers the water table, at which time the drains should be blocked. Management practices should include selection of appropriate plants and applications of fertilizer during planting operations.

This soil is moderately suited to pasture. When the soil is wet, grazing causes compaction of the surface layer and damage to the plant community. Excess surface water can be removed from most areas by installing and maintaining field drains. Tall fescue, coastal bermudagrass, and bahiagrass are the best suited pasture plants. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is very poorly suited to cultivated crops. The main limitations are the periodic wetness and the low fertility. Corn and grain sorghum are the best suited crops to plant. A drainage system is needed for most cultivated crops and pasture plants. Proper row arrangement, lateral ditches or tile drains, and properly constructed outlets will remove the excess surface water. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer and lime generally are needed.

This soil provides good habitat for deer, bobcats, skunks, opossums, raccoons, quail, and turkeys and for many birds, particularly warblers. It provides fair habitat for squirrels and poor habitat for doves. Wildlife in the urban areas consists mostly of birds. The areas of this soil that have been left in native vegetation provide a good source of food, cover, and escape routes for most wildlife.

If this soil is used for urban development, the main limitations are the periodic wetness and droughtiness. Drainage is needed if roads and building foundations are constructed. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of water supplies resulting from seepage. Septic tank absorption fields are mounded in most areas (fig. 7). Unless vegetation is established, erosion and sedimentation commonly are problems in some water management systems. Wind erosion is a problem in unvegetated areas and is especially severe in the spring.

Native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of American holly, cabbage palm, common persimmon, live oak, longleaf pine, and slash pine. The native shrubs include American beautyberry, coontie, coralbean, partridge pea, pawpaw, saw palmetto, shining sumac, tarflower, and southern waxmyrtle. The herbaceous plants are blazingstar, Catesby lily, grassleaf goldaster, hibiscus, iris, meadow beauty, sunflower, and zephyr lily.

This soil is poorly suited to recreational development. The main limitations are the wetness and the sandy texture of the surface layer. The loose sand makes

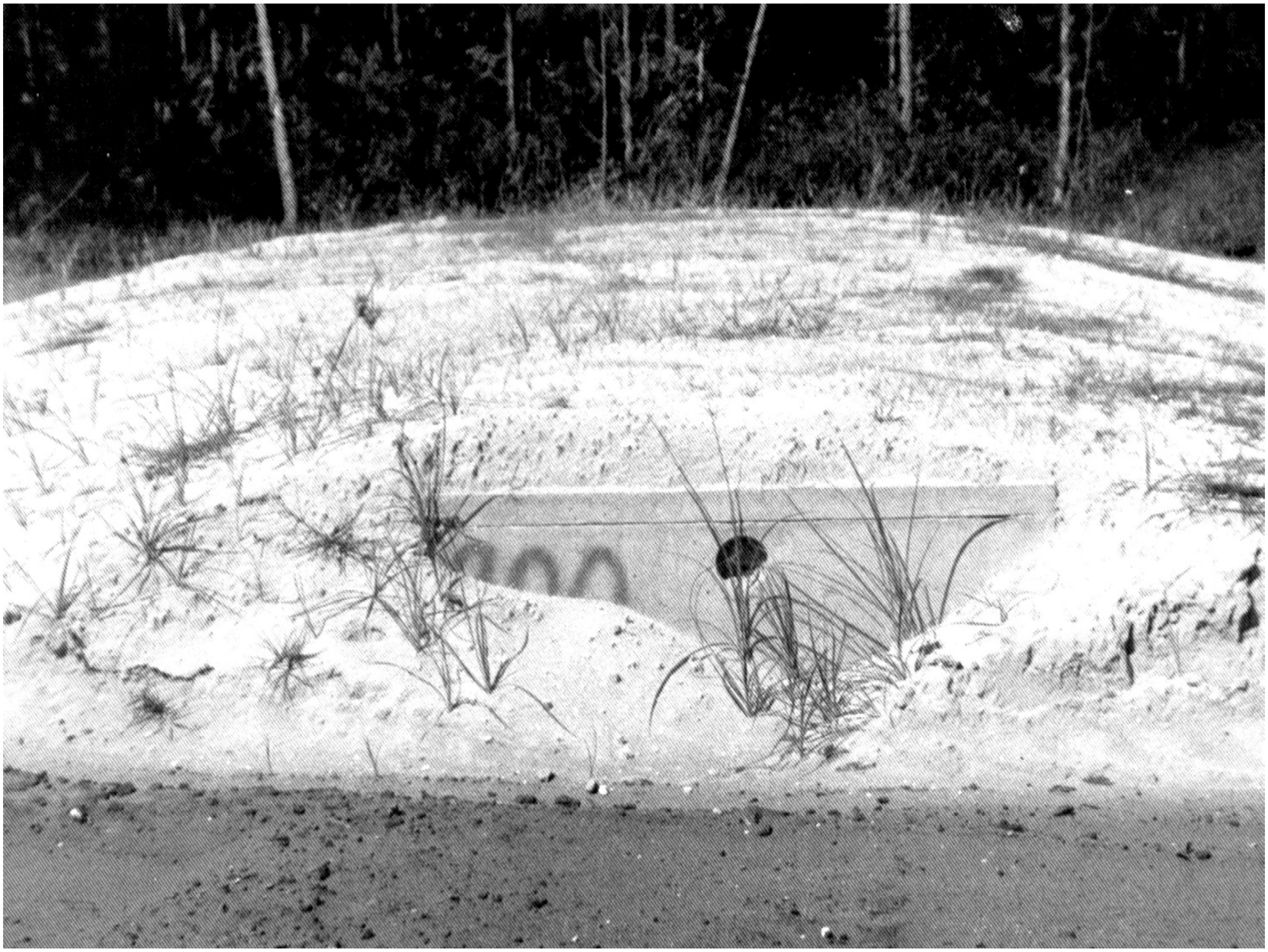


Figure 7.—A septic tank absorption field in an area of Goldhead fine sand. It was mounded because the seasonal high water table is near the soil surface.

walking difficult. Good drainage should be provided for paths and trails. Vehicles are easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is IIIw, and the woodland ordination symbol is 11W.

14—Rutlege mucky fine sand, frequently flooded. This nearly level, very poorly drained soil is in narrow drainageways. It is frequently flooded for very long periods in most years (fig. 8). The mapped areas range from about 3 to 100 acres. Slopes are smooth or concave and are 0 to 2 percent.

In 90 percent of the areas mapped as Rutlege mucky fine sand, frequently flooded, Rutlege and similar soils make up 76 to 100 percent of the map unit. Dissimilar soils make up 0 to 24 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is about 16 inches thick. It is black mucky fine sand in the upper part and very dark gray fine sand in the lower part. The underlying material, to a depth of about 80 inches, is fine sand. It is dark gray in the upper part, gray in the next part, and light gray in the lower part. Some soils occurring in areas of this map unit are similar to the Rutlege soil but

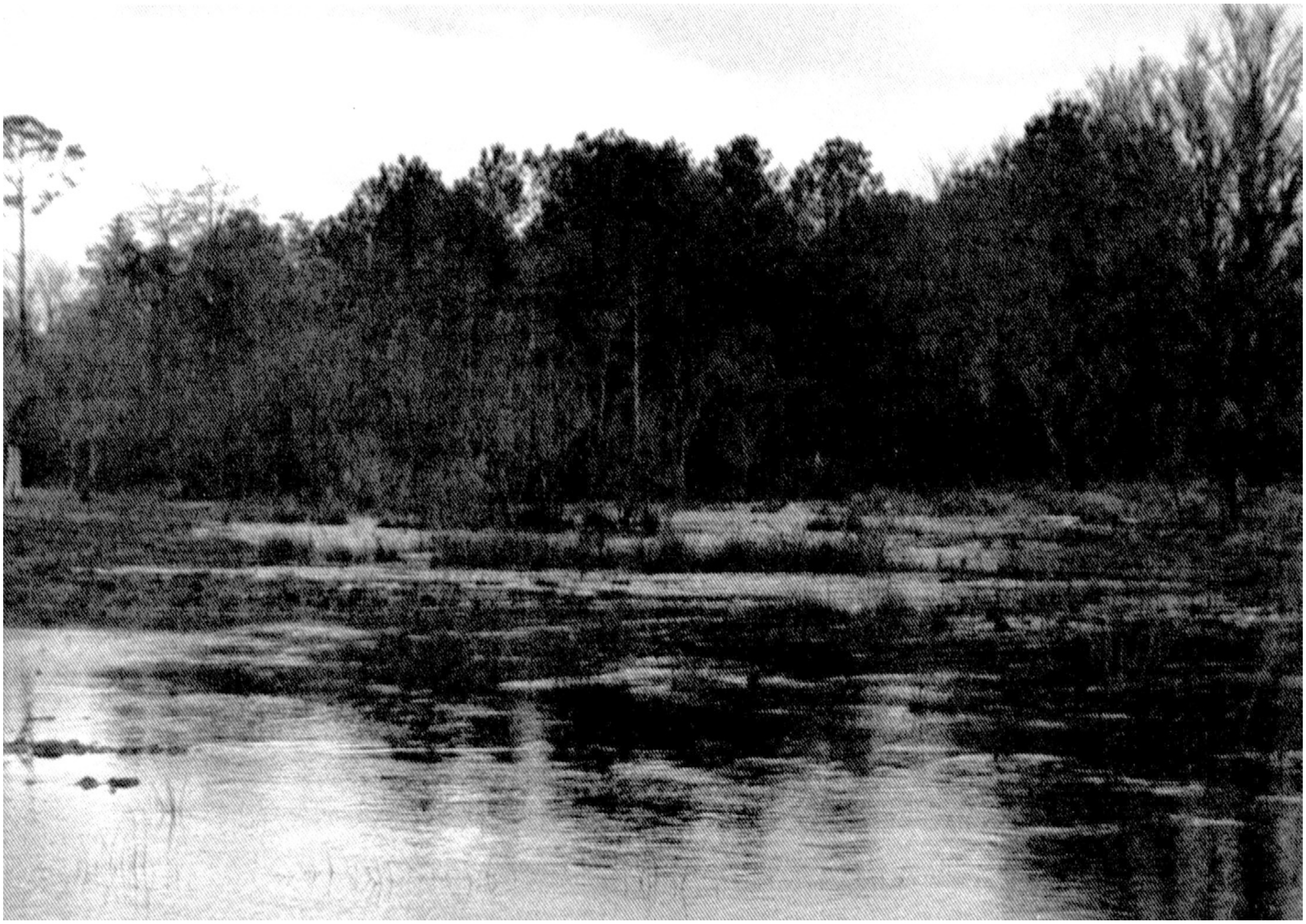


Figure 8.—An area of Rutlege mucky fine sand, frequently flooded, after a period of heavy rainfall.

have a surface layer that is covered with 4 to 8 inches of organic material or have a dark surface layer that is less than 10 inches thick in places.

Included in this map unit are small areas of dissimilar soils. These are Croatan, Ellabelle, and Kingsferry soils. Croatan and Ellabelle soils are in landscape positions similar to those of the Rutlege soil. Kingsferry soils are on low flatwoods. Other included soils are similar to the Croatan soils but have only 8 to 16 inches of organic material.

Permeability of this Rutlege soil is rapid. The available water capacity is very high in the surface layer and low in the underlying material. The seasonal high water table is at or near the surface during most of the year. The soil is moderate in natural fertility.

This soil is used mainly as woodland. The natural vegetation consists of baldcypress, water tupelo, pond pine, and sweetgum. The understory includes giant gallberry, huckleberry, greenbrier, and bayberry.

This soil generally is not suited to pine trees. Under natural conditions, however, it is suited to cypress and hardwoods. The major management concern is the high water table, which causes severe seedling mortality. The water table and the high organic matter content in the surface layer prevent the use of heavy equipment. Adequate drainage outlets generally are not available; therefore, drainage is not practical.

This soil is very poorly suited to pasture and to cultivated crops because of the wetness and the flooding.

This soil provides good habitat for waterfowl, reptiles, and amphibians and for mammals, such as gray squirrels, minks, raccoons, and river otters. Many birds inhabit the area, including the chickadee, titmouse, yellow-billed cuckoo, wood duck, limpkin, acadian flycatcher, owl, hooded warbler, cedar waxwing, woodpecker, and wren. The various hardwoods provide a good source of food and cover for the wildlife.

This soil is very poorly suited to urban or recreational development because of the wetness and the flooding.

The land capability classification is VIw. This soil has not been assigned a woodland ordination symbol.

15—Buccaneer clay, frequently flooded. This nearly level, very poorly drained soil is in large drainageways on the flood plains. It is frequently flooded for very long periods in most years. The mapped areas range from about 50 to 500 or more acres. Slopes are smooth or convex and are 0 to 2 percent.

In 94 percent of the areas mapped as Buccaneer clay, frequently flooded, Buccaneer and similar soils make up 88 to 99 percent of the map unit. Dissimilar soils make up 1 to 12 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is black clay about 5 inches thick. The subsoil, to a depth of about 65 inches, is clay. It is very dark gray in the upper part, dark gray in the next part, and gray in the lower part. The substratum, to a depth of about 80 inches, is light olive gray clay. Soils occurring in areas of this map unit that are similar to the Buccaneer soil are Ellabelle soils and some soils that have a surface layer covered with less than 8 inches of organic material, that are sandy within 60 inches of the surface, that are rarely flooded, or that have a sandy clay loam subsoil.

Included in this map unit are small areas of dissimilar soils. These are Croatan and Meggett soils. Croatan soils are in positions on the landscape similar to those of the Buccaneer soil. Meggett soils are on broad, low flats.

Permeability of this Buccaneer soil is very slow. The available water capacity is high or very high. The seasonal high water table is at or above the surface for 6 to 9 months of the year. The surface layer remains wet for long periods after heavy rainfall. The soil is high in natural fertility.

This soil is used mainly as woodland. The natural vegetation consists of baldcypress, sweetgum, water tupelo, and water oak. The most common grass is panicum.

The potential of this soil for the production of baldcypress trees is high. The main concerns in producing and harvesting timber are the equipment limitation and seedling mortality. The wetness is a limitation affecting the use of equipment. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during extended dry periods can help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations. If nursery stock is used to establish or improve a stand, hand planting generally is necessary. Drainage is needed. Overcoming the wetness is very difficult.

This soil is not suited to pasture, to cultivated crops, or to urban or recreational development because of the wetness and the flooding.

This soil provides good habitat for a large variety of wildlife, especially for waterfowl, reptiles, and amphibians and for mammals, such as gray squirrels, minks, raccoons, and river otters. Many birds inhabit this area, including the chickadee, titmouse, yellow-billed cuckoo, wood duck, limpkin, acadian flycatcher, owl, woodcock, hooded warbler, cedar waxwing, woodpecker, and wren. The various hardwoods provide a good source of food and cover for these wildlife species.

The land capability classification is VIw. This soil has not been assigned a woodland ordination symbol.

16—Ellabelle mucky fine sand, frequently flooded. This nearly level, very poorly drained soil is in drainageways. It is frequently flooded for very long periods during most years. The mapped areas range from about 3 to 100 acres. Slopes are smooth or convex and are 0 to 2 percent.

In 91 percent of the areas mapped as Ellabelle mucky fine sand, frequently flooded, Ellabelle and similar soils make up 86 to 97 percent of the map unit. Dissimilar soils make up 3 to 14 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is about 12 inches thick. It is black mucky fine sand in the upper part and very dark gray fine sand in the lower part. The subsurface layer, to a depth of about 36 inches, is fine sand. It is gray in the upper part and grayish brown in the lower part. The subsoil, to a depth of 80 inches or more, is dark gray sandy clay loam in the upper part, grayish brown sandy clay in the next part, and greenish gray sandy clay in the lower part. Some soils occurring in areas of this map unit are similar to the Ellabelle soil but have as much as 8 inches of muck on the surface, have a loamy subsoil at a depth of more than 40 inches, have a subsoil that is sandy within 60 inches of the surface, or have a loamy subsoil that is 6 to 20 inches thick.

Included in this map unit are small areas of dissimilar soils. These are Kingsferry, Meggett, and Goldhead soils. Kingsferry, Meggett, and Goldhead soils are on broad, low flats.

Permeability of this Ellabelle soil is moderately rapid in the upper part of the soil and moderately slow in the lower part. The available water capacity is low in the surface and subsurface layers and moderate or high in the subsoil. The seasonal high water table is at or near the surface for 6 to 9 months of the year. The surface layer remains wet for long periods after heavy rainfall. The soil is low in natural fertility.

This soil is used mainly as woodland. The natural vegetation consists of pond pine, sweetgum, blackgum, water oak, baldcypress, and water tupelo. The understory includes fetterbush lyonia, red maple, southern bayberry, giant gallberry, and sweetbay. The native grasses include plumegrass, longleaf uniola, and sedge.

This soil generally is very poorly suited to pine trees. Under natural conditions, however, it is suited to cypress and hardwoods. The major management concern is the high water table, which causes severe seedling mortality. The water table and the high organic matter content in the surface layer prevent the use of heavy equipment. Adequate drainage outlets generally are not available; therefore, drainage is not practical.

This soil is very poorly suited to pasture, to cultivated crops, and to urban or recreational development because of the flooding and the wetness.

This soil provides good habitat for waterfowl, reptiles, and amphibians and for mammals, such as gray squirrels, minks, raccoons, and river otters. Many birds inhabit the area, including the chickadee, titmouse, yellow-billed cuckoo, wood duck, limpkin, acadian flycatcher, owl, woodcock, hooded warbler, cedar waxwing, woodpecker, and wren. The various hardwoods provide a good source of food and cover for these wildlife species.

The land capability classification is Vw. This soil has not been assigned a woodland ordination symbol.

17—Urban land. This map unit consists of areas that are 75 percent or more covered with streets, houses, commercial buildings, parking lots, shopping centers, industrial parks, airports, and related urban facilities.

Included in mapping are very small areas of Meggett, Leon, Kureb, Mandarin, Resota, and Goldhead soils. These included soils are mostly in areas of lawns, parks, vacant lots, and playgrounds. Other areas are made up of drastically disturbed soil material. The included soils are in tracts that are too small to be mapped separately.

This map unit has not been assigned a land capability classification nor a woodland ordination symbol.

18—Lynn Haven-Wesconnett-Leon complex, depressional. These nearly level, very poorly drained soils are in depressions on flatwoods. The water table is above the surface for 6 to 9 months in most years. The mapped areas range from about 3 to 40 acres. Slopes are smooth or concave and are 0 to 2 percent.

In 93 percent of the areas mapped as Lynn Haven-Wesconnett-Leon complex, depressional, Lynn Haven, Wesconnett, and Leon soils make up 86 to 100 percent of the map unit. Dissimilar soils make up 0 to 14 percent. They generally are in areas less than 3 acres in size.

Generally, the mapped areas are about 35 percent Lynn Haven soils, 30 percent Wesconnett soils, 28 percent Leon soils, and 7 percent dissimilar soils. The soils in this map unit are so intermingled that it is not practical to map them separately at the scale used. The proportions and patterns of the Lynn Haven, Wesconnett, and Leon soils, however, are relatively consistent in most areas.

Typically, the surface layer of the Lynn Haven soil is about 9 inches thick. It is black fine sand in the upper part and very dark gray fine sand in the lower part. The subsurface layer, to a depth of about 25 inches, is fine sand. It is gray in the upper part and light gray in the lower part. The subsoil, to a depth of about 80 inches, is fine sand. It is black in the upper part and dark reddish brown in the lower part.

Typically, the surface layer of the Wesconnett soil is fine sand about 12 inches thick. It is black in the upper part and very dark gray in the lower part. The subsoil, to a depth of about 65 inches, is fine sand. It is black in the upper part, dark reddish brown in the next part, and yellowish brown in the lower part. The substratum, to a depth of about 80 inches, is grayish brown fine sand.

Typically, the surface layer of the Leon soil is black muck about 3 inches thick. Below that layer, to a depth of about 8 inches, is black fine sand. The subsurface layer, to a depth of about 17 inches, is light brownish gray fine sand. The subsoil extends to a depth of about 80 inches. It is dark reddish brown loamy fine sand in the upper part and dark reddish brown fine sand in the lower part.

Included in this map unit are small areas of dissimilar soils. These are Evergreen soils. They are in the center of the map unit and have an organic surface layer.

Permeability of these Lynn Haven, Wesconnett, and Leon soils is rapid in the upper part of the soil and moderate or moderately rapid in the lower part. The available water capacity is low, moderate, or very high in the surface layer, low or moderate in the subsurface layer, and moderate in the subsoil. These soils are low or medium in natural fertility.

These soils are used mainly as woodland. The natural vegetation consists of cypress and pond pine. The understory includes pondweed. The most common grass is maidencane.

These soils are very poorly suited to pine trees. Under natural conditions, however, they are suited to cypress and hardwoods. The major management concern is the high water table, which causes seedling mortality. The water table and the high organic matter content in the surface layer prevent the use of heavy equipment. Adequate drainage outlets generally are not available; therefore, drainage is not practical in these areas.

These soils are very poorly suited to urban or recreational development because of the ponding.

The land capability classification is VIIw. These soils have not been assigned a woodland ordination symbol.

19—Leon fine sand, tidal. This nearly level, very poorly drained soil is in narrow tidal marshes bordering flatwoods. It is subject to flooding by normal high tides. The mapped areas range from about 3 to 50 acres. Slopes are smooth and are 0 to 2 percent.

In 96 percent of the areas mapped as Leon fine sand, tidal, Leon soils make up 88 to 100 percent of the map unit. Dissimilar soils make up about 0 to 12 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is fine sand about 26 inches thick. It is dark gray in the upper part and very dark gray in the lower part. The upper part of the subsoil, to a depth of about 40 inches, is dark grayish brown and dark brown fine sand. Separating the upper and lower parts of the subsoil, to a depth of about 43 inches, is a buried subsurface layer of light gray fine sand. The lower part of the subsoil, to a depth of about 58 inches, is dark brown fine sand. The substratum, to a depth of 80 inches or more, is dark olive gray fine sand.

Included in this map unit are small areas of dissimilar soils. These are Tisonia soils and Arents. Arents are higher on the landscape than the Leon soils, and Tisonia soils are lower.

Permeability of this Leon soil is moderately rapid in the surface layer and moderate or moderately rapid in the subsoil and the substratum. The available water capacity is low to high. The seasonal high water table is at or near the surface during most of the year. The soil is low in natural fertility.

The natural vegetation consists of saltwort, bushy seaoxeye, marshhay cordgrass, seashore cordgrass, batis, and smooth cordgrass.

This soil is not suited to pine trees, pasture, or cultivated crops because of the excessive salinity, the flooding, and the wetness.

Salt marshes provide good habitat for a variety of wildlife. The habitat generally is maintained by natural forces and influences, such as by tidal action and periodic hurricanes.

Storms generally create "open" water in salt and brackish marshes and also change salinity levels. The resulting effect is that plant succession is set back and a more favorable habitat can be created for waterfowl, furbearers, and other forms of wildlife, such as wading birds. Artificially created dikes that control salinity are used in managing marsh plants for wildlife. Prescribed burning is also used in marsh management.

This soil is very poorly suited to urban or recreational development. The main limitations are the excessive salinity, the wetness, and the flooding.

The land capability classification is VIIIw. This soil has not been assigned a woodland ordination symbol.

20—Ortega fine sand, 0 to 5 percent slopes. This nearly level and gently sloping, moderately well drained soil is on narrow to broad ridges and on isolated knolls. The mapped areas range from about 3 to 85 acres. Slopes are smooth or concave.

In 93 percent of the areas mapped as Ortega fine sand, 0 to 5 percent slopes, Ortega and similar soils make up 88 to 98 percent of the map unit. Dissimilar soils make up about 2 to 12 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is gray fine sand about 6 inches thick. The underlying material is fine sand to a depth of about 80 inches or more. It is brown and light yellowish brown in the upper part, pale brown in the next part, and light gray in the lower part. Soils occurring in areas of this map unit that are similar to the Ortega soil are Blanton and Centenary soils and, in the community of Crandall, Ortega soils that have a dark gray and very dark gray surface layer 10 to 30 inches thick.

Included in this map unit are small areas of dissimilar soils. These are Albany, Hurricane, Kershaw, and

Ridgewood soils. Albany, Hurricane, and Ridgewood soils are on the lower ridges and on flatwoods. Kershaw soils are on the more elevated ridges and knolls.

Permeability of this Ortega soil is rapid. The available water capacity is very low or low. The seasonal high water table is at a depth of 42 to 60 inches for 6 to 8 months of the year. The soil is very low in natural fertility.

In most areas this soil is used as woodland. In a few areas it is used for urban development.

The natural vegetation consists of slash pine, longleaf pine, turkey oak, and live oak. The understory includes saw palmetto. The most common grasses are pineland threeawn, lopsided indiangrass, hairy panicum, grassleaf lovegrass, purple lovegrass, broom sedge, and creeping and chalky bluestems.

This soil is moderately suited to slash pine, loblolly pine, and longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine and loblolly pine is 55 feet. The potential production is 23 cords per acre for slash pine and 31 cords per acre for loblolly pine *(7)* based on a 25-year rotation. The average site index for longleaf pine is 60 feet. The estimated potential production is 30 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are the equipment limitation and seedling mortality. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during dry periods can help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations.

Site preparation, such as roller chopping, burning, applications of herbicide, and bedding, can reduce the amount of debris, control immediate plant competition, and facilitate mechanical planting. Hardwood understory can be reduced by controlled burning, applications of herbicide, or girdling or cutting of the unwanted trees. A major management concern is the low available water capacity, which causes severe seedling mortality and retards plant growth. Planting special nursery stock that is larger than usual or that is containerized can reduce the seedling mortality rate. Natural regeneration may be preferable in the drier areas. Management practices should include selecting appropriate plants and leaving debris on the site. The soil commonly is very low in organic matter content. Harvesting methods that remove all tree biomass from the site further reduce the fertility of the soil. Logging operations should leave residual biomass distributed over the site.

This soil is moderately suited to pasture. The main limitations are the available water capacity and rapid leaching of plant nutrients. The very low or low available water capacity is a limitation affecting plant growth during extended dry periods. Deep-rooted plants, such as coastal bermudagrass and bahiagrass, are more drought tolerant if fertilizer and lime are added. Proper stocking rates, pasture rotation, and timely deferment of grazing can help to keep the pasture in good condition.

The soil is poorly suited to cultivated crops. The main limitations are droughtiness and the rapid leaching of plant nutrients. Grain sorghum is the best suited crop to plant. Droughtiness is a concern in management, especially during extended dry periods. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture can help to maintain fertility. Frequent applications of fertilizer and lime generally are needed.

This soil provides habitat for deer and turkeys. Many birds inhabit the area, including warblers, towhees, crested flycatchers, doves, and quail. Several varieties of native legumes furnish food for the birds. The harvesting of timber and similar disturbances improve wildlife food values by increasing the amount, availability, and types of herbaceous plants and by producing new sprouts. Wildlife in the urban areas consists mostly of birds. The areas of this soil that have been left in native vegetation provide a good source of food, cover, and escape routes for most wildlife.

This soil is well suited to urban development. The main limitation is the droughtiness. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of water supplies resulting from seepage. Septic tank absorption fields are mounded in most areas. Establishing vegetation commonly is difficult because the soil is infertile, coarse textured, and droughty. Intensive management practices are needed to establish and maintain vegetation on this soil, including irrigation and applications of adequate fertilizer. Unless vegetation is established, wind erosion can become a problem during and after construction.

Native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of American holly, Chickasaw plum, longleaf pine, slash pine, live oak, southern redcedar, sand pine, turkey oak, and bluejack oak. The native shrubs include adam's needle, American beautyberry, Carolina holly, coontie, coralbean, Florida chinkapin, pawpaw, pricklypear cactus, saw palmetto, shining sumac, and yaupon. The herbaceous plants are aster, beebalm, crotalaria, blanketflower, blazingstar, goldaster, lupine, morningglory, goldenrod, and sunflower.

This soil is poorly suited to recreational development. The main limitation is the sandy texture of the surface layer. A plant cover is difficult to establish and maintain, but it can be maintained by controlling heavy traffic and by irrigating. Vehicles are easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is IIIs, and the woodland ordination symbol is 10S.

21—Blanton fine sand, 0 to 5 percent slopes. This nearly level and gently sloping, somewhat poorly drained or moderately well drained soil is on narrow to broad ridges and isolated knolls. The mapped areas range from about 3 to 80 acres. Slopes are smooth or concave.

In 90 percent of the areas mapped as Blanton fine sand, 0 to 5 percent slopes, Blanton and similar soils make up 82 to 99 percent of the map unit. Dissimilar soils make up 1 to 18 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is very dark grayish brown fine sand about 6 inches thick. The upper part of the subsurface layer, to a depth of about 42 inches, is pale brown fine sand. The lower part, to a depth of about 56 inches, is light gray fine sand. The subsoil extends to a depth of 80 inches or more. It is brownish yellow sandy clay loam that has mottles in shades of gray, yellow, and brown in the upper part and mixed light gray, brownish yellow, and strong brown sandy clay loam in the lower part. Ortega soils, which are similar to the Blanton soil, are in areas of this map unit.

Included in this map unit are small areas of dissimilar soils. These are Albany, Ocilla, Penney, and Ridgewood soils. Albany, Ocilla, and Ridgewood soils are in slightly lower positions on the landscape than the Blanton soil, and Penney soils are in higher positions.

Permeability of this Blanton soil is rapid in the surface and subsurface layers and moderate in the subsoil. The available water capacity is very low or low in the surface and subsurface layers and moderately rapid in the upper part of the subsoil. The seasonal high water table is at a depth of 30 to 48 inches for 1 to 4 months of the year and at a depth of 48 to 60 inches for 4 to 8 months or more. The soil is low in natural fertility.

In most areas this soil is used as woodland. In a few areas it is used for pasture or crops.

The natural vegetation consists of longleaf pine, slash pine, flowering dogwood, turkey oak, and water oak. The most common grasses are pineland threeawn, broomsedge bluestem, and low panicum.

This soil is moderately suited to slash pine, loblolly pine, and longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine and loblolly pine is 55 feet. The potential production is 23 cords per acre for slash pine and 31 cords per acre for loblolly pine *(7)* based on a 25-year rotation. The average site index for longleaf pine is 65 feet. The estimated potential production is 36 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are seedling mortality, the equipment limitation, and plant competition. Using tracks or floatation tires on harvesting and planting machinery and scheduling harvesting operations during dry periods can help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations. Construction of access roads, logging activities, and site preparation should be avoided in streambeds and adjacent areas because of the hazard of erosion. Tree limbs and tops should be kept clear of the stream channel because they can block streamflow. Stream crossing should be avoided if possible. Culverts and bridges may be needed.

Site preparation, such as roller chopping, burning, applications of herbicide, and bedding, can reduce the amount of debris, control immediate plant competition, and facilitate mechanical planting. Special site preparation, such as harrowing and bedding, can help to establish seedlings, reduce the seedling mortality rate, and increase the early growth rate. Bedding should be planned so that it does not impair natural surface drainage. Conventional harvesting methods generally are suitable. If heavy equipment is used during wet periods, the extent of soil compaction will increase. Management practices should include selection of appropriate plants and use of fertilizer during planting operations. The soil commonly is very low in organic matter content. Harvesting methods that remove all tree biomass from the site further reduce the fertility of the soil. Logging operations should leave residual biomass distributed over the site.

This soil is moderately well suited to pasture. The main limitations are droughtiness and the low fertility. Coastal bermudagrass and bahiagrass are the best suited grasses to plant. Proper stocking rates, pasture rotation, and timely deferment of grazing can help to keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is poorly suited to cultivated crops. The low fertility and the droughtiness are the main limitations. If water-control and soil-improving measures are applied, the soil is moderately well suited to most cultivated crops. The main crops are corn, grain sorghum, and tobacco. The soil is friable, is easy to keep in good tilth, and can be worked throughout a wide range of moisture content. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer and lime generally are needed.

The mixed hardwoods and pines on this soil provide very good habitat for deer, turkeys, squirrels, and birds. Hardwood mast, such as acorns, nuts, fruits, buds, and berries, is a good source of food for wildlife. The mature hardwoods and snags provide good nesting sites for birds. This soil also provides good habitat for raccoons, opossums, bobwhite quail, and doves; fair habitat for reptiles; and poor habitat for most amphibians. Wildlife in the urban areas consists mostly of birds and squirrels. The areas of this soil that have been left in native vegetation provide good cover and escape routes for most wildlife.

If this soil is used for urban development, the main limitations are the periodic wetness and droughtiness. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of water supplies resulting from seepage. Septic tank absorption fields are mounded in most areas.

Housing development plans should provide for the preservation of as many trees as possible. Native trees and plants are easily established and require less maintenance than introduced ornamentals. The native trees consist of American holly, laurel cherry, Chickasaw plum, dogwood, hickory, southern magnolia, oak, pine, persimmon, redbud, red maple, red cedar, and sweetgum. The native shrubs include American beautyberry, coralbean, pawpaw, strawberry bush, shining sumac, viburnum, and waxmyrtle. The herbaceous plants are aster, beebalm, blazingstar, iris, and sunflower.

If this soil is used for recreational development, the main limitations are the wetness and the sandy texture of the surface layer. Good drainage is needed for paths and trails. Plant cover can be maintained by controlling heavy traffic and by irrigating. Vehicles are easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is IIIs, and the woodland ordination symbol is 11S.

22—Sapelo-Leon fine sands. These nearly level, poorly drained soils are on broad flatwoods. The mapped areas range from about 3 to 50 acres. Slopes are smooth and are 0 to 2 percent.

In 93 percent of the areas mapped as Sapelo-Leon fine sands, Sapelo, Leon, and similar soils make up 86 to 99 percent of the map unit. Dissimilar soils make up about 1 to 14 percent. They generally are in areas less than 3 acres in size.

Generally, the mapped areas are about 59 percent Sapelo and similar soils, 34 percent Leon soils, and 7 percent dissimilar soils. The soils in this map unit are so intermingled that it is not practical to map them separately at the scale used. The proportions and patterns of the Sapelo, Leon, and similar soils, however, are relatively consistent in most areas.

Typically, the surface layer of the Sapelo soil is black fine sand about 6 inches thick. The subsurface layer, to a depth of about 21 inches, is gray and light gray fine sand. The upper part of the subsoil, to a depth of about 27 inches, is black fine sand. Separating the upper and lower parts of the subsoil, to a depth of about 43 inches, is a buried subsurface layer of dark brown loamy fine sand. The lower part of the subsoil, to a depth of about 70 inches, is gray fine sandy loam and light brownish gray sandy clay loam. The substratum, to a depth of about 80 inches, is gray loamy fine sand. Chaires soils, which are similar to the Sapelo soil, are in areas of this map unit.

Typically, the surface layer of the Leon soil is very dark gray fine sand about 5 inches thick. The subsurface layer, to a depth of about 20 inches, is gray fine sand. The upper part of the subsoil, to a depth of about 24 inches, is black and dark reddish brown fine sand. Separating the upper and lower parts of the subsoil is a buried subsurface layer of brown fine sand. The lower part of the subsoil, to a depth of 80 inches or more, is thin pale brown fine sand and light gray fine sand.

Included in this map unit are small areas of dissimilar soils. These are Albany, Leon, Goldhead, and Meadowbrook soils. Albany soils are on slightly elevated ridges. Leon soils are on flatwoods. Goldhead and Meadowbrook soils are in sloughs and depressions.

Permeability of these Sapelo and Leon soils is rapid in the surface, subsurface, and buried subsurface layers and moderate or moderately rapid in the subsoil. The available water capacity is very low or low in the surface, subsurface, and buried subsurface layers and moderate in the subsoil. The seasonal high water table is within 12 inches of the surface for 1 to 4 months of the year. These soils are very low in natural fertility.

These soils are used mainly as woodland. The natural vegetation consists of slash pine, longleaf pine, and water oak. The understory includes saw palmetto, gallberry, southern bayberry, and dwarf huckleberry. The most common grasses are pineland threeawn, creeping bluestem, pineywoods dropseed, and panicum.

These soils are moderately suited to slash pine, loblolly pine, and longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine and loblolly pine is 55 to 60 feet. The potential production is 23 to 28 cords per acre for slash pine and 31 to 36 cords per acre for loblolly pine *(7)* based on a 25-year rotation. The average site index for longleaf pine is 65 to 70 feet. The estimated potential production is 36 to 43 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are the equipment limitation and seedling mortality. The wetness is a limitation affecting use of equipment. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during dry periods help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations. Construction of access roads, logging activities, and site preparation should be avoided in streambeds and adjacent areas because of the hazard of erosion. Tree limbs and tops should be kept clear of the stream channel because they can block streamflow.

Site preparation, such as roller chopping, burning, applications of herbicide, and bedding, can reduce the amount of debris, control immediate plant competition, and facilitate mechanical planting. Special site preparation, such as harrowing and bedding, can help to establish seedlings, reduce the seedling mortality rate, and increase the early growth rate. Bedding should be planned so that it does not impair natural surface drainage. Short-term drainage is needed in some of the more wet areas until the pine's uptake of water lowers the water table, at which time the drains should be blocked. A major management concern is the low available water capacity, which causes severe seedling mortality and retards plant growth. Management practices should include selection of appropriate plants and applications of fertilizer during planting operations. These soils commonly are very low in organic matter content. Harvesting methods that remove all tree biomass from the site further reduce the fertility of the soils. Logging operations should leave residual biomass distributed over the site.

These soils are well suited to pasture. The main limitations are the periodic wetness and droughtiness and the very low fertility. The wetness limits the choice of plants that can be grown and the period of grazing. When the soil is wet, grazing causes compaction of the surface layer and damage to the plant community. The low available water capacity limits the production of plants suitable for pasture. Drought-tolerant plants, such as bahiagrass, coastal bermudagrass, and legumes, are the best suited pasture plants. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

These soils are very poorly suited to cultivated crops. The main limitations are the periodic wetness and droughtiness and the very low fertility. Corn and grain sorghum are the best suited crops to plant. Proper row arrangement, field ditches, and vegetated outlets help remove excess surface water. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer and lime generally are needed.

These soils provide very good habitat for deer, bobcats, quail, turkeys, skunks, opossums, and raccoons and for many songbirds, particularly warblers. These soils provide fair habitat for squirrels and poor habitat for doves.

These soils are poorly suited to urban development. The main limitation is the wetness. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of water supplies resulting from seepage. Septic tank absorption fields are mounded in most areas. The moderate permeability can be overcome by increasing the size of the septic tank absorption fields. Unless vegetation is established, erosion and sedimentation commonly are problems in some water management systems. Wind erosion is a problem in unvegetated areas and is especially severe in the spring. Drainage is needed if roads and building foundations are constructed. The wetness can be reduced by installing tile drains around the footings.

Housing development plans should provide for the preservation of as many trees as possible. These soils need to be mulched, fertilized, and irrigated to establish and maintain lawn grasses and other small seeded plants. Drainage is needed for most lawn grasses, shade trees, ornamental trees, shrubs, vines, and vegetable gardens. Native plants should be used for landscaping and beautification because they are more easily established and require less maintenance than other plants. The native trees consist of American holly, cabbage palm, common persimmon, live oak, longleaf pine, and slash pine. The native shrubs include American beautyberry, coontie, coralbean, partridge pea, pawpaw, saw palmetto, shining sumac, tarflower, and southern waxmyrtle. The herbaceous plants are blazingstar, Catesby lily, grassleaf goldaster, hibiscus, iris, meadow beauty, sunflower, and zephyr lily.

These soils are poorly suited to recreational development. The main limitations are the wetness and the sandy texture of the surface layer. The loose sand makes walking difficult. Good drainage is needed for paths and trails. Vehicles are easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is IVw. The woodland ordination symbol is 7W for the Sapelo soil and 8W for the Leon soil.

23—Ocilla fine sand, 0 to 5 percent slopes. This nearly level and gently sloping, somewhat poorly drained soil is on narrow to broad ridges and on isolated knolls. The mapped areas range from about 3 to 90 acres. Slopes are smooth or concave.

In about 94 percent of the areas mapped as Ocilla fine sand, 0 to 5 percent slopes, Ocilla and similar soils make up 84 to 100 percent of the map unit. Dissimilar soils make up 0 to 16 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is gray fine sand about 7 inches thick. The subsurface layer is fine sand to a depth of about 34 inches. It is light yellowish brown in the upper part and light gray in the lower part. The subsoil extends to a depth of about 80 inches. It is brownish yellow loamy fine sand in the upper part, gray sandy clay loam in the next part, and light brownish gray fine sandy loam in the lower part. Albany and Leefield soils, which are similar to the Ocilla soil, are in areas of this map unit.

Included in this map unit are small areas of dissimilar soils. These are Chaires and Goldhead soils. They are on flatwoods.

Permeability of this Ocilla soil is moderately rapid or rapid in the surface and subsurface layers and moderately slow in the subsoil. The available water capacity is low in the surface and subsurface layers and low or moderate in the subsoil. The seasonal high water table is at a depth of 12 to 30 inches for 2 to 6 months of the year. The soil is low in natural fertility.

In most areas this soil is used as woodland. In a few areas it is used for pasture or crops.

The natural vegetation consists of longleaf pine, slash pine, turkey oak, and water oak. The understory includes gallberry. The most common grasses are pineland threeawn, little bluestem, pinehill bluestem, slender bluestem, panicum, toothachegrass, and switchgrass.

This soil is well suited to slash pine and loblolly pine and is moderately suited to longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine and loblolly pine is 65 feet. The potential production is 34 cords per acre for slash pine and 42 cords per acre for loblolly pine *(7)* based on a 25-year rotation. The average site index for longleaf pine is 70 feet. The estimated potential production is 43 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are seedling mortality, the equipment limitation, and plant competition. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during dry periods help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations. Measures that reduce the hazard of erosion are needed when timber is harvested. Construction of access roads, logging activities, and site preparation should be avoided in streambeds and adjacent areas because of the hazard of erosion. Tree limbs and tops should be kept clear of the stream channel because they can block streamflow. Stream crossing should be avoided if possible. Culverts and bridges may be needed.

Site preparation, such as roller chopping, burning, applications of herbicide, and bedding, can reduce the amount of debris, control immediate plant competition, and facilitate mechanical planting. Special site preparation, such as harrowing and bedding, can help to establish seedlings, reduce the seedling mortality rate, and increase the early growth rate. Bedding should be planned so that it does not impair natural surface drainage. Conventional harvesting methods generally are suitable. If heavy equipment is used during wet periods, the extent of soil compaction will increase. Management practices include selecting appropriate plants, fertilizing during planting operations, and leaving debris on the site.

This soil is moderately suited to pasture. Grazing when the soil is wet results in compaction of the surface layer and damage to the plant community. Excess surface water can be removed from most areas by installing and maintaining field drains. Coastal bermudagrass and bahiagrass are the best suited pasture plants. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is poorly suited to cultivated crops. The main limitations are the periodic wetness and the sandy surface layer. If water-control and soil-improving measures are applied, the soil is moderately well suited to most cultivated crops. Corn, grain sorghum, and tobacco are the main crops. The soil is friable, is easy to keep in good tilth, and can be worked throughout a wide range of moisture content. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer and lime generally are needed.

This soil provides very good habitat for deer, turkey, and squirrel and for many birds. Hardwood mast, such as acorns, nuts, fruits, buds, and berries, is a good source of food for wildlife. The mature hardwoods and snags provide good nesting sites for birds. The soil also provides good habitat for raccoons, opossums, bobwhite quail, and doves; fair habitat for reptiles; and poor habitat for most amphibians. Wildlife in the urban areas consists mostly of birds and squirrels. The areas of this soil that have been left in native vegetation provide a good source of food, cover, and escape routes for most wildlife.

This soil is moderately suited to urban development. The main limitations are the periodic wetness and droughtiness. Drainage is needed if roads and building foundations are constructed. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of water supplies resulting from seepage. Septic tank absorption fields are mounded in most areas.

Housing development plans should provide for the preservation of as many trees as possible. Vegetation is difficult to establish because the soil is infertile, coarse textured, and droughty. Selection of suitable vegetation is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. Native plants are more easily established and require less maintenance than introduced ornamentals. The native trees consist of American holly, laurel cherry, Chickasaw plum, dogwood, fringe tree, hickory, southern magnolia, oak, pine, persimmon, redbud, red maple, red cedar, and sweetgum. The native shrubs include American beautyberry, coralbean, pawpaw, strawberry bush, shining sumac, viburnum, and waxmyrtle. The herbaceous plants are aster, beebalm, blazingstar, iris, and sunflower.

This soil is poorly suited to recreational development. The main limitations are the wetness and the sandy texture of the surface layer. The loose sand makes walking difficult. Good drainage should be provided for paths and trails. A plant cover is somewhat difficult to establish and maintain, but it can be maintained by controlling heavy traffic and by irrigating.

The land capability classification is IIIw, and the woodland ordination symbol is 8W.

24—Kingsferry fine sand. This nearly level, very poorly drained soil is on broad, low flats. The mapped areas are from about 3 to 75 acres. Slopes are smooth and are 0 to 2 percent.

In 89 percent of the areas mapped as Kingsferry fine sand, Kingsferry and similar soils make up 78 to 100 percent of the map unit. Dissimilar soils make up 0 to 22 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is fine sand about 17 inches thick. It is black in the upper part, very dark gray in the next part, and dark gray in the lower part. The subsoil is fine sand to a depth of about 80 inches. It is very dark gray in the upper part, dark reddish brown in the next part, and black in the lower part. Boulogne soils, which are similar to the Kingsferry soil, are in areas of this map unit.

Included in this map unit are small areas of dissimilar soils. These are Leon, Lynn Haven, and Rutlege soils.

Leon soils are in the higher positions on flatwoods. Lynn Haven soils are in depressions. Rutlege soils are in drainageways.

Permeability of this Kingsferry soil is moderately rapid in the surface and subsurface layers and in the upper part of the subsoil and is moderately slow in the lower part of the subsoil. The available water capacity is moderate. The seasonal high water table is within 6 inches of the surface for 2 to 6 months of the year and is at the surface for 1 to 3 months. It is at a depth of 24 inches for 6 to 9 months of the year. The soil is low in natural fertility.

This soil is used mainly as woodland. The natural vegetation consists of slash pine and longleaf pine. The understory includes giant gallberry, gallberry, saw palmetto, and greenbrier. The most common grasses are wiregrass, bushy bluestem, and switchcane.

This soil generally is very poorly suited to pine trees. Under natural conditions, however, it is suited to cypress and hardwoods. The major management concern is the high water table, which causes seedling mortality. The water table and the high organic matter content in the surface layer prevent the use of heavy equipment (fig. 9). Adequate drainage outlets generally are not available; therefore, drainage is not practical.

This soil is well suited to pasture. The main limitation is the wetness, which affects the choice of plants that can be grown and the period of grazing. When the soil is wet, grazing causes compaction of the surface layer and damage to the plant community. The low available water capacity is a limitation affecting the growth of plants that are suitable for pasture. Drought-tolerant plants, such as bahiagrass, coastal bermudagrass, and legumes, are the best suited pasture plants. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is poorly suited to cultivated crops. The main limitation is the wetness. Corn and grain sorghum are the best suited crops to plant. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer and lime generally are needed.

This soil provides good habitat for deer, bobcats, skunks, opossums, raccoons, quail, and turkeys and for birds, particularly warblers. It provides fair habitat for squirrels and poor habitat for doves. Wildlife in urban areas consists mostly of birds. The areas of this soil that have been left in native vegetation provide a good source of food, cover, and escape routes for most wildlife.

This soil is very poorly suited to urban development. The main limitation is the wetness. The native trees consist of American holly, cabbage palm, common persimmon, live oak, longleaf pine, and slash pine. The native shrubs include American beautyberry, coontie, coralbean, partridge pea, pawpaw, saw palmetto, shining sumac, tarflower, southern lily, grassleaf goldaster, hibiscus, iris, meadow beauty, sunflower, and zephyr lily.

This soil is poorly suited to recreational development. The main limitations are the wetness and the sandy texture of the surface layer. The loose sand makes walking difficult. Good drainage should be provided for paths and trails. Vehicles are easily mired down.

The land capability classification is IVw. This soil has not been assigned a woodland ordination symbol.

25—Maurepas muck, frequently flooded. This nearly level, very poorly drained soil is in drainageways and along the tributaries of major streams that are influenced by tidal action. It is frequently flooded for brief to very long periods in most years. The mapped areas range from about 3 to 100 acres. Slopes are smooth or concave and are 0 to 1 percent.

In 86 percent of the areas mapped as Maurepas muck, frequently flooded, Maurepas soils make up 78 to 95 percent of the map unit. Dissimilar soils make up 5 to 22 percent. They generally are in areas less than 5 acres in size.

Typically, the surface layer is muck to a depth of about 80 inches or more. It is very dark brown in the upper 5 inches and black in the lower part.

Included in this map unit are small areas of dissimilar soils. These are Croatan, Evergreen, and Rutlege soils. Croatan, Evergreen, and Rutlege soils are adjacent to mineral soils. Also included are soils that have organic layers less than 51 inches thick and are underlain by loamy material.

Permeability of this Maurepas soil is rapid. The available water capacity is very high. The seasonal high water table is near or above the surface for 6 to 9 months of the year. The soil is high in natural fertility.

This soil is used mainly as woodland. The natural vegetation consists of loblolly pine, baldcypress, water tupelo, blackgum, sweetgum, and sweetbay. The understory includes giant gallberry, greenbrier, bayberry, fetterbush lyonia, aster, and willow.

The potential of this soil for production of baldcypress and pond pine is high. The main concerns in producing

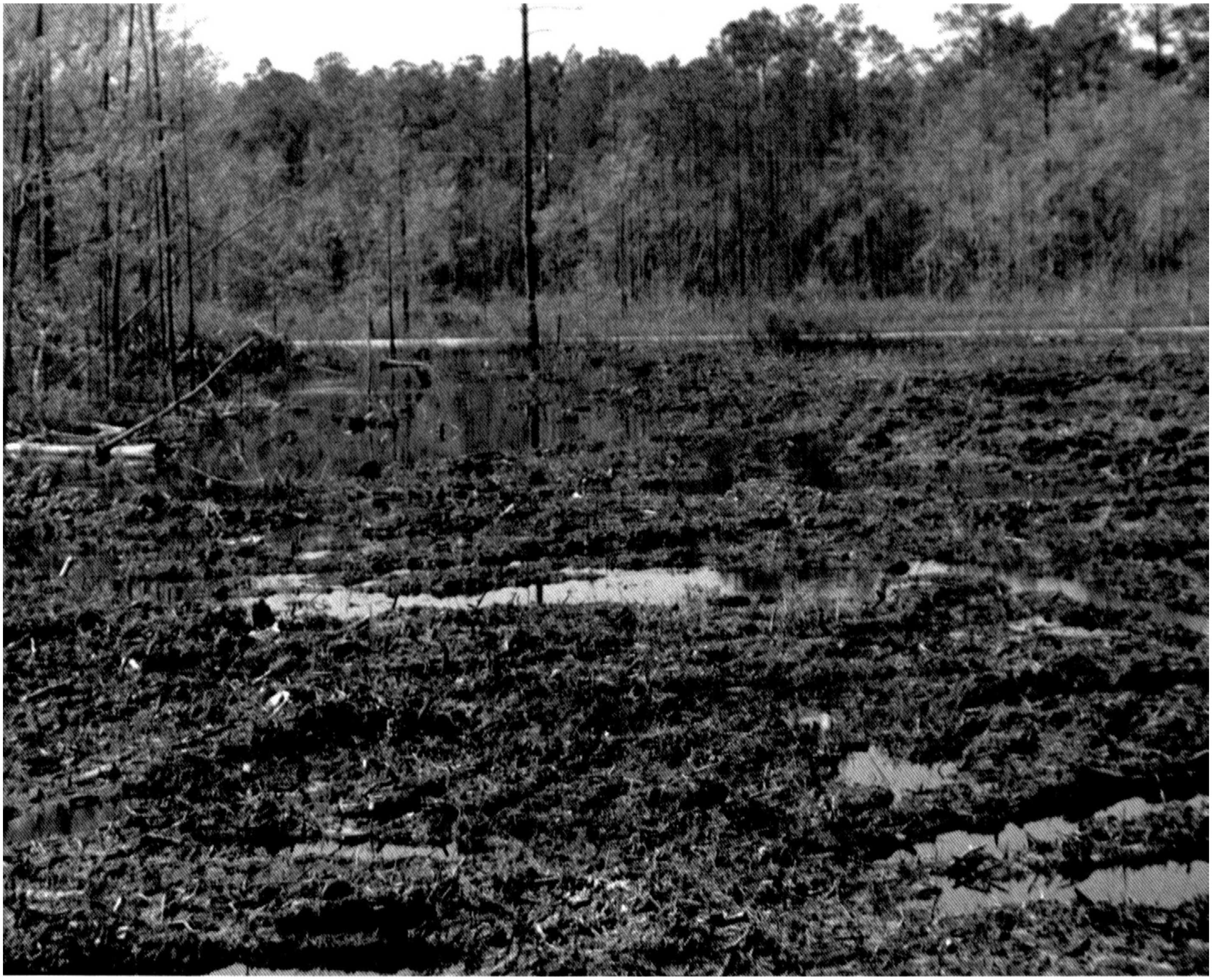


Figure 9.—An area of Kingsferry fine sand. Long periods of wetness make it difficult to use heavy equipment for harvesting timber.

and harvesting timber are seedling mortality and the equipment limitation. The wetness is a limitation affecting the use of equipment. The trees selected for planting should be those that are water tolerant. Planting and harvesting operations should be scheduled during extended dry periods. If nursery stock is used to establish or improve a stand, hand planting generally is needed. A major management concern is the high water, which causes very severe seedling mortality. Overcoming the wetness is very difficult. Management practices should include selection of appropriate plants.

This soil is very poorly suited to pasture, to cultivated crops, and to urban or recreational development because of the flooding, the wetness, and subsidence of the soil.

This soil provides good habitat for a large variety of wildlife, especially for waterfowl, reptiles, and amphibians and for mammals, such as gray squirrels, minks, raccoons, and river otters. Many birds inhabit the area, including the chickadee, titmouse, yellow-billed cuckoo, wood duck, limpkin, acadian flycatcher, owl, woodcock, hooded warbler, cedar waxwing, woodpecker, and wren. The various hardwoods provide a good source of food and cover for these wildlife species.

The land capability classification is VIIIw. This soil has not been assigned a woodland ordination symbol.

26—Centenary fine sand, 0 to 5 percent slopes. This nearly level and gently sloping, moderately well drained soil is on narrow to broad ridges and on isolated knolls. The mapped areas range from about 3 to 90 acres. Slopes are smooth or concave.

In 88 percent of the areas mapped as Centenary fine sand, 0 to 5 percent slopes, Centenary and similar soils make up 76 to 99 percent of the map unit. Dissimilar soils make up 1 to 24 percent. They generally are in areas less than 3 acres in size.

Typically, the upper 3 inches of the surface layer is dark gray fine sand and the lower 4 inches is light grayish brown fine sand. The subsurface layer, to a depth of about 66 inches, is fine sand. It is light yellowish brown in the upper part and light gray in the lower part. The subsoil, to a depth of about 80 inches, is fine sand. It is dark brown in the upper part and dark reddish brown in the lower part. Some soils occurring in areas of this map unit are similar to the Centenary soil but have a dark subsoil at a depth of more than 80 inches. These soils are near the community of Crandall.

Included in this map unit are small areas of dissimilar soils. These are Hurricane and Ortega soils. Hurricane soils are in lower positions on the landscape than the Centenary soil. Ortega soils are in landscape positions similar to those of the Centenary soil.

Permeability of this Centenary soil is rapid in the surface and subsurface layers and moderately rapid in the subsoil. The available water capacity is very low or low. Depth to the seasonal high water table and the effective rooting depth are about 42 to 60 inches for 2 to 4 months of the year. The soil is very low in natural fertility.

In most areas this soil is used as woodland. In a few areas it is used for urban development.

The natural vegetation consists of slash pine, longleaf pine, turkey oak, and live oak. The understory includes saw palmetto. The most common grasses are pineland threeawn, little bluestem, panicum, toothachegrass, cutover muhly, and switchgrass.

This soil is moderately suited to slash pine and longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine is 60 feet. The potential production is 24 cords per acre for slash pine *(7)* based on a 25-year rotation. The average site index for longleaf pine is 70 feet. The estimated potential production is 43 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are the equipment limitation and seedling mortality. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during dry periods help to overcome the equipment limitation. Site preparation, such as roller chopping, burning, applications of herbicide, and bedding, can reduce the amount of debris, control immediate plant competition, and facilitate mechanical planting. Hardwood understory can be reduced by controlled burning, applications of herbicide, or girdling or cutting of the unwanted trees. A major management concern is the low available water capacity, which causes severe seedling mortality and retards plant growth. Planting special nursery stock that is larger than usual or that is containerized can reduce the seedling mortality rate. Natural regeneration may be preferable in the drier areas. Management practices should include selecting appropriate plants and leaving debris on the site. These soils commonly are very low in organic matter content. Harvesting methods that remove all tree biomass from the site further reduce the fertility of the soil. Logging operations should leave residual biomass distributed over the site.

This soil is moderately well suited to pasture. The main limitations are the low available water capacity and rapid leaching of plant nutrients. The available water capacity is a limitation affecting plant growth during extended dry periods. Deep-rooted plants, such as coastal bermudagrass and bahiagrass, are more drought tolerant if fertilizer and lime are added. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is poorly suited to cultivated crops. The main limitations are droughtiness and the very low soil fertility. Grain sorghum is a suitable crop to plant. Droughtiness is a concern in management, especially during extended dry periods. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer and lime generally are needed.

This soil provides good habitat for deer and turkeys.

Many birds inhabit the area, including warblers, towhees, crested flycatchers, doves, and quail. Several varieties of native legumes furnish food for the birds. The harvesting of timber and similar disturbances improve wildlife food values by increasing the amount, availability, and types of herbaceous plants and by producing new sprouts. Wildlife in the urban areas consists mostly of birds. The areas of this soil that have been left in native vegetation provide a good source of food, cover, and escape routes for most wildlife.

This soil has few limitations if used for urban development. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of water supplies resulting from seepage. Septic tank absorption fields should be mounded. Establishing vegetation commonly is difficult because of the droughty soil conditions. Bedding should be on the contour, if possible, to reduce soil erosion. Intensive management practices, including irrigation during dry periods, are needed to establish and maintain vegetation on this soil. Maintenance is a problem without adequate applications of fertilizer. Unless vegetation is established, wind erosion can be a problem during and after construction.

Unless intensive management practices are used to establish and maintain vegetation on this soil, native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of American holly, Chickasaw plum, longleaf pine, slash pine, live oak, southern redcedar, sand pine, turkey oak, and bluejack oak. The native shrubs include adam's needle, American beautyberry, Carolina holly, coontie, coralbean, Florida chinkapin, pawpaw, pricklypear cactus, saw palmetto, shining sumac, and yaupon. The herbaceous plants are aster, beebalm, crotalaria, blanketflower, blazingstar, goldaster, lupine, morningglory, goldenrod, and sunflower.

This soil is poorly suited to recreational development. The main limitation is the sandy texture of the surface layer. A plant cover is difficult to establish and maintain, but it can be maintained by controlling heavy traffic and by irrigating. Vehicles are easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is IIIs, and the woodland ordination symbol is 11S.

27—Ridgewood fine sand, 0 to 5 percent slopes. This nearly level and gently sloping, somewhat poorly drained soil is on narrow to broad ridges and on isolated knolls. The mapped areas range from about 3 to 100 acres. Slopes are smooth or convex.

In 91 percent of the areas mapped as Ridgewood fine sand, 0 to 5 percent slopes, Ridgewood and similar soils make up 83 to 99 percent of the map unit. Dissimilar soils make up 1 to 17 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is gray fine sand about 7 inches thick. The subsoil, to a depth of about 24 inches, is light yellowish brown fine sand. The substratum, to a depth of 80 inches or more, is fine sand. It is light yellowish brown in the upper part, pale brown in the next part, and light gray in the lower part. Soils occurring in areas of this map unit that are similar to the Ridgewood soil are the Albany and Hurricane soils. These soils have a water table that is slightly higher than that of the Ridgewood soil where they are on the lower parts of the landscape.

Included in this map unit are small areas of dissimilar soils. These are Centenary, Mandarin, Ortega, and Pottsburg soils. Centenary and Ortega soils are on the higher ridges. Mandarin and Pottsburg soils are on flatwoods.

Permeability of this Ridgewood soil is rapid. The available water capacity is very low or low. The seasonal high water table is at a depth of 18 to 42 inches for 2 to 4 months of the year. It rises to a depth of 15 to 24 inches for brief periods of less than 3 weeks. The soil is very low in natural fertility.

This soil is used mainly as woodland. In a few areas it is used for pasture or crops.

The natural vegetation consists of longleaf pine, slash pine, turkey oak, bluejack oak, and live oak. The understory includes American holly, gallberry, and saw palmetto. The most common grasses are pineland threeawn, broomsedge bluestem, and panicum.

This soil is well suited to slash pine and moderately suited to longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine and loblolly pine is 60 feet. The potential production is 28 cords per acre for slash pine *(7)* based on a 25-year rotation. The average site index for longleaf pine is 70 feet. The estimated potential production is 43 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are seedling mortality, the equipment limitation, and plant competition. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during extended dry periods help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations. Construction of access roads, logging activities, and site preparation should be avoided in streambeds and adjacent areas because of the hazard of erosion. Tree limbs and tops should be kept clear of the stream channel because they can block streamflow. Stream crossing should be avoided if possible. Culverts and bridges may be needed.

Site preparation, such as roller chopping, burning, applications of herbicide, and bedding, can reduce the amount of debris, control immediate plant competition, and facilitate mechanical planting. Special site preparation, such as harrowing and bedding, can help to establish seedlings, reduce the seedling mortality rate, and increase the early growth rate. Bedding should be planned so that it does not impair natural surface drainage. Conventional harvesting methods generally are suitable. If heavy equipment is used during wet periods, the extent of soil compaction will increase. Management practices should include selection of appropriate plants and applications of fertilizer during planting operations. These soils commonly are low in organic matter content. Harvesting methods that remove all tree biomass from the site further reduce soil fertility. Logging operations should leave residual biomass distributed over the site.

This soil is moderately well suited to pasture because of droughtiness and the very low fertility. When the soil is wet, grazing causes compaction of the surface layer and damage to the plant community. Excess surface water can be removed from most areas by installing and maintaining field drains. Coastal bermudagrass and bahiagrass are the best suited pasture plants. Proper stocking rates, pasture rotation, and the timely deferment of grazing help to keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is poorly suited to cultivated crops. The main limitations are the periodic wetness and droughtiness and the very low fertility. If water-control and soil-improving measures are applied, the soil is moderately well suited to most cultivated crops. Corn and grain sorghum are the main crops. The soil is friable, is easy to keep in good tilth, and can be worked throughout a wide range of moisture content. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility. Frequent applications of fertilizer and lime generally are needed.

This soil provides good habitat for deer and turkeys. Many birds inhabit the area, including warblers, towhees, crested flycatchers, doves, and quail. Several varieties of native legumes furnish food for the birds. The harvesting of timber and similar disturbances improve wildlife food values by increasing the amount, availability, and types of herbaceous plants and by producing new sprouts. Wildlife in the urban areas consists mostly of birds. The areas of this soil that have been left in native vegetation provide a good source of food, cover, and escape routes for most wildlife.

This soil is moderately suited to urban development. The main limitations are the periodic wetness and droughtiness. Drainage is needed if roads and building foundations are constructed. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of water supplies resulting from seepage. Septic tank absorption fields should be mounded. Establishing vegetation commonly is difficult because the soil is infertile, coarse textured, and somewhat poorly drained. Intensive management practices, including irrigation during dry periods, are needed to establish and maintain vegetation on this soil. Maintenance can be a problem without adequate applications of fertilizer. Unless vegetation is established, wind erosion can be a problem during and after construction and water erosion can be a problem on the steeper slopes.

Unless intensive management practices are used to establish and maintain vegetation on this soil, native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of American holly, Chickasaw plum, longleaf pine, slash pine, live oak, southern redcedar, sand pine, turkey oak, and bluejack oak. The native shrubs include adam's needle, American beautyberry, Carolina holly, coontie, coralbean, Florida chinkapin, pawpaw, pricklypear cactus, saw palmetto, shining sumac, and yaupon. The herbaceous plants are aster, beebalm, crotalaria, blanketflower, blazingstar, goldaster, lupine, morningglory, goldenrod, and sunflower.

This soil is poorly suited to recreational development. The main limitations are the wetness and the sandy texture of the surface layer. The loose sand makes walking difficult. Good drainage should be provided for paths and trails. A plant cover is difficult to establish and maintain, but it can be maintained by controlling heavy traffic and by irrigating. Vehicles are easily mired down.

The land capability classification is IVs, and the woodland ordination symbol is 8S.

28—Tisonia mucky peat, frequently flooded. This nearly level, very poorly drained soil is in broad tidal marshes. It is subject to flooding daily during high tide. The mapped areas range from about 10 to 1,000 or more acres. Slopes are smooth and are 0 to 1 percent.

In 98 percent of the areas mapped as Tisonia mucky peat, frequently flooded, Tisonia soils make up 95 to 100 percent of the map unit. Dissimilar soils make up 0 to 5 percent. They generally are in areas less than 5 acres in size.

Typically, the surface layer is very dark grayish brown mucky peat about 40 inches thick. The underlying material, to a depth of about 65 inches, is dark olive gray clay.

Included in this map unit are small areas of dissimilar soils. These are Maurepas and Kingsland soils. They are in drainageways. Trees grow on these soils.

Permeability of this Tisonia soil is rapid in the upper part of the soil and very slow in the lower part. The available water capacity is very high. The seasonal high water table is at or near the surface during most of the year.

The natural vegetation consists of needlegrass rush, seashore saltgrass, marshhay cordgrass, and smooth cordgrass.

This soil is not suited to pine trees, to pasture, to cultivated crops, or to urban or recreational development because of excessive salinity, wetness, and the flooding.

The land capability classification is VIIIw. This soil has not been assigned a woodland ordination symbol.

29—Resota fine sand, 0 to 5 percent slopes. This nearly level and gently sloping, moderately well drained soil is on narrow to broad ridges and on isolated knolls. The mapped areas range from about 3 to 25 acres. Slopes are smooth or convex.

In 95 percent of the areas mapped as Resota fine sand, 0 to 5 percent slopes, Resota and similar soils make up 86 to 100 percent of the map unit. Dissimilar soils make up 0 to 14 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is dark gray fine sand about 4 inches thick. The subsurface layer, to a depth of about 27 inches, is gray and light gray fine sand. The subsoil, to a depth of about 80 inches, is yellowish brown and light yellowish brown fine sand. Soils occurring in areas of this map unit that are similar to the Resota soil are Echaw soils and some soils that have a dark subsoil at a depth of 80 inches or less.

Included in this map unit are small areas of dissimilar soils. These are Kureb and Ridgewood soils. Kureb soils are on the more elevated ridges. Ridgewood soils are on lower ridges. Also included are soils near Fort Clinch State Park. These soils have shell fragments in the substratum.

Permeability of this Resota soil is very rapid. The available water capacity is very low. The seasonal high water table is at a depth of 42 to 60 inches for 6 to 9 months of the year. The soil is very low in natural fertility.

This soil is used mainly for woodland. In a few areas it is used for urban development.

The natural vegetation consists of slash pine, longleaf pine, live oak, and water oak. The understory includes saw palmetto. The most common native grasses are pineland threeawn, sand heath, panicum, and bluestem.

This soil is moderately suited to longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site index for longleaf pine is 65 feet. The estimated potential production is 36 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are the equipment limitation and seedling mortality. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during dry periods help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations. Site preparation, such as roller chopping, burning, applications of herbicide, and bedding, can reduce the amount of debris, control immediate plant competition, and facilitate mechanical planting. Hardwood understory can be reduced by controlled burning, applications of herbicide, or girdling or cutting of the unwanted trees. Planting special nursery stock that is larger than usual or that is containerized can reduce the seedling mortality rate. Natural regeneration may be preferable in the drier areas. Management practices should include selecting appropriate plants and leaving debris on the site. The soil commonly is very low in organic matter content. Harvesting methods that remove all tree biomass from the site further reduce soil fertility. Logging operations should leave residual biomass distributed over the site.

This soil is very poorly suited to pasture and to cultivated crops.

This soil provides habitat for deer and turkeys. Many birds inhabit the area, including warblers, rufous-sided towhees, great crested flycatchers, scrub jays, and quail. Several varieties of native legumes furnish food for the birds. Palmetto, gopher apple, and various oaks provide a good source of food when they are bearing fruit. The harvesting of timber and other disturbances increase wildlife food value by increasing the amount, availability, and types of herbaceous plants and by producing new sprouts. Wildlife in the urban areas consists mostly of birds. Gopher tortoises, scrub lizards, and snakes are some of the reptiles inhabiting urban areas. The areas of this soil that have been left in native vegetation provide good cover and escape routes for most wildlife.

This soil is well suited to urban development. The main limitation is droughtiness. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of water supplies resulting from seepage. Septic tank absorption fields are mounded in most areas. Vegetation is difficult to establish because the soil is infertile, coarse textured, and droughty. Water moves rapidly through the soil. Intensive management practices, including irrigation, are needed to establish and maintain vegetation on this soil. Unless vegetation is established, wind erosion can be a problem during and after construction. Erosion-control and water-retention facilities generally are not needed.

Selection of suitable vegetation is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. Mulch, fertilizer, and irrigation are needed to establish lawn grasses and other small seeded plants. Native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of live oak, sand live oak, sand pine, turkey oak, and eastern redcedar. The native shrubs include adam's needle, coralbean, Carolina holly, gopher apple, pawpaw, pricklypear cactus, rosemary, saw palmetto, and shining sumac. The herbaceous plants are aster, beebalm, crotalaria, blanketflower, blazingstar, goldaster, goldenrod, lupine, morningglory, and sunflower.

This soil is poorly suited to recreational development. The main limitation is the sandy texture of the surface layer. The loose sand makes walking difficult. A plant cover is difficult to establish and maintain, but it can be maintained by controlling heavy traffic and by irrigating. Vehicles are easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is VIs, and the woodland ordination symbol is 8S.

30—Kureb-Resota fine sands, rolling. These gently rolling to hilly, excessively drained and moderately well drained soils are on narrow, dunelike ridges along the Atlantic coast. The mapped areas range from about 10 to 525 acres. Slopes are smooth, convex, or concave and range from 0 to 20 percent.

In 83 percent of the areas mapped as Kureb-Resota fine sands, rolling, Kureb, Resota, and similar soils make up 75 to 91 percent of the map unit. Dissimilar soils make up 9 to 25 percent. They generally are in areas less than 5 acres in size.

Generally, the mapped areas are about 53 percent Kureb soils, 30 percent Resota and similar soils, and 17 percent dissimilar soils. The soils in this map unit are so intermingled that it is not practical to map them separately at the scale used. The proportions and patterns of Kureb, Resota, and similar soils, however, are relatively consistent in most areas.

The Kureb soil is nearly level to hilly and is excessively drained. It is at higher elevations than the Resota soil and has slopes as much as 20 percent. Typically, the surface layer is dark gray fine sand about 2 inches thick. The subsurface layer, to a depth of about 10 inches, is light brownish gray fine sand. The subsoil, to a depth of about 30 inches, is light yellowish brown fine sand. The underlying material, to a depth of about 80 inches, is fine sand. It is very pale brown in the upper part and white in the lower part.

The Resota soil is nearly level and gently sloping and is moderately well drained. It is at low elevations and has slopes of 5 to 8 percent. Typically, the surface layer is dark gray fine sand about 4 inches thick. The subsurface layer, to a depth of about 27 inches, is gray and light gray fine sand. The subsoil, to a depth of about 80 inches, is yellowish brown and light yellowish brown fine sand. In places a dark subsoil is within about 80 inches of the surface. Echaw soils, which are similar to the Resota soil, are in areas of this map unit.

Included in this map unit are small areas of dissimilar soils. These are Leon, Mandarin, and Ridgewood soils. The southern part of Amelia Island has a higher percentage of inclusions. Leon and Mandarin soils are on low flatwoods. Ridgewood soils are in landscape positions similar to those of the Kureb and Resota soils.

Permeability of the Kureb and Resota soils in this map unit is rapid or very rapid. The available water capacity is very low. The Kureb soil has a seasonal high water table at a depth of about 72 to more than 80 inches during most of the year. The Resota soil has a seasonal high water table at a depth of about 42 to 60 inches for 6 months or more in most years and at a depth of 60 to 80 inches during dry periods. Both of these soils are very low in natural fertility.

These soils are used mainly for urban development.

The natural vegetation consists of live oak and water oak. The understory includes saw palmetto and yaupon. The most common grasses are pineland threeawn, pinehill bluestem, little bluestem, and slender bluestem.

These soils are poorly suited to longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site index for longleaf pine is 50 to 55 feet. The estimated potential production is 20 to 36 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are seedling mortality and the equipment limitation. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during dry periods help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations. Hardwood understory can be reduced by controlled burning, applications of herbicide, or girdling or cutting of the unwanted trees. A major management concern is the very low available water capacity, which causes severe seedling mortality and retards plant growth. Planting special nursery stock that is larger than usual or that is containerized can reduce the seedling mortality rate. Natural regeneration may be preferable on drier sites. Management practices should include selecting appropriate plants and leaving debris on the site. These soils commonly are very low in organic matter content. Harvesting methods that remove all tree biomass from the site further reduce soil fertility. Logging operations should leave residual biomass distributed over the site.

These soils are very poorly suited to pasture and to cultivated crops because of droughtiness and the very low natural fertility.

These soils provide good habitat for deer and turkeys. Many birds inhabit the area, including warblers, rufous-sided towhees, great crested flycatchers, scrub jays, and quail. Several varieties of native legumes provide food for the birds. Palmetto, gopher apple, and various oaks provide a good source of food when they are bearing fruit. The harvesting of timber and other disturbances increase wildlife food value by increasing the amount, availability, and types of herbaceous plants and by producing new sprouts. Wildlife in the urban areas consists mostly of birds. Gopher tortoise, sand skink, scrub lizard, and snakes are some of the reptiles that also inhabit these areas. The areas of this soil that have been left in native vegetation provide good cover, food, and travel and escape routes for most wildlife.

These soils are moderately suited to urban development. The main limitations are the slope and the droughtiness. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of water supplies resulting from seepage. Vegetation is difficult to establish because the soil is infertile, coarse textured, and droughty. Water moves rapidly through the soil. Intensive management practices, including irrigation, are needed to establish and maintain vegetation on these soils. Unless vegetation is established, wind erosion can be a problem during and after construction. Erosion-control and water-retention facilities generally are needed.

Native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of live oak, sand live oak, sand pine, turkey oak, and eastern redcedar. The native shrubs include adam's needle, coralbean, Carolina holly, gopher apple, pawpaw, pricklypear cactus, rosemary, saw palmetto, and shining sumac. The herbaceous plants are aster, beebalm, crotalaria, blanketflower, blazingstar, goldaster, goldenrod, lupine, morningglory, and sunflower.

These soils are poorly suited to recreational development. The main limitations are the slope and the sandy texture of the surface layer. Because of the slope, the recreation areas on these soils are limited to a few paths and trails, which should extend across the slope. A plant cover is difficult to establish and maintain, but it can be maintained by controlling heavy traffic and by irrigating. Vehicles are easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is VIIs. The woodland ordination symbol is 3S for the Kureb soil and 8S for the Resota soil.

31—Kershaw fine sand, 2 to 8 percent slopes. This gently sloping or sloping, excessively drained soil is on broad ridges and on isolated knolls. The mapped areas range from about 3 to 50 acres. Slopes are smooth or concave.

In 98 percent of the areas mapped as Kershaw fine sand, 2 to 8 percent slopes, Kershaw and similar soils make up 92 to 100 percent of the map unit. Dissimilar soils make up 0 to 8 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is very dark grayish brown fine sand about 7 inches thick. The underlying material, to a depth of about 80 inches, is fine sand. It is yellowish brown in the upper part and yellow in the lower part. Some soils occurring in areas of this map unit are similar to the Kershaw soil but have a light colored subsurface layer 1 to 4 inches thick.

Included in this map unit are small areas of dissimilar soils. These are Ortega soils. They are in lower positions on the landscape than the Kershaw soil.

Permeability of this Kershaw soil is very rapid. The available water capacity is very low. The seasonal high water table is at a depth of about 72 to 80 inches or more during most of the year. The soil is very low in natural fertility.

This soil is used mainly for urban development.

The natural vegetation consists of longleaf pine, live oak, and turkey oak. The understory includes saw palmetto and yaupon. The most common grasses are pineland threeawn, pinehill bluestem, little bluestem, and slender bluestem.

This soil is poorly suited to slash pine and longleaf pine and well suited to sand pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine is 40 feet. The potential production is 11 cords per acre for slash pine *(7)* based on a 25-year rotation. The average site index is 50 feet for longleaf pine and 75 feet for sand pine. The estimated potential production is 24 cords per acre for longleaf pine and 34 cords per acre for sand pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are seedling mortality and the equipment limitation. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during dry periods help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations. Hardwood understory can be reduced by controlled burning, applications of herbicide, or girdling or cutting of the unwanted trees. A major management concern is the low available water capacity, which causes severe seedling mortality and retards plant growth. Planting special nursery stock that is larger than usual or that is containerized can reduce the seedling mortality rate. Natural regeneration may be preferable on the drier sites. Management practices should include selecting appropriate plants and leaving debris on the site. The soil commonly is very low in organic matter content. Harvesting methods that remove all tree biomass from the site further reduce soil fertility. Logging operations should leave residual biomass distributed over the site.

This soil is very poorly suited to pasture and to cultivated crops because of the droughtiness and the very low fertility.

This soil provides habitat for deer and turkeys. Many birds inhabit the area, including warblers, towhees, crested flycatchers, doves, and quail. Several varieties of native legumes furnish food for the birds. The harvesting of timber and similar disturbances improve wildlife food values by increasing the amount, availability, and types of herbaceous plants and by producing new sprouts. Wildlife in the urban areas consists mostly of birds. The areas of this soil that have been left in native vegetation provide a good source of food, cover, and escape routes for most wildlife.

This soil is moderately suited to urban development. The main limitation is the droughtiness and the sandy texture of the surface layer. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of water supplies resulting from seepage. Septic tank absorption fields are mounded in most areas. Establishing vegetation commonly is difficult because the soil is infertile, coarse textured, and droughty. Intensive management practices, including irrigation during dry periods, are needed to establish and maintain vegetation on this soil. Maintenance can be a problem without adequate applications of fertilizer. Unless vegetation is established, wind erosion can be a problem during and after construction.

Unless intensive management practices are used to establish and maintain vegetation, native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of American holly, Chickasaw plum, longleaf pine, slash pine, live oak, southern redcedar, sand pine, turkey oak, and bluejack oak. The native shrubs include adam's needle, American beautyberry, Carolina holly, coontie, coralbean, Florida chinkapin, pawpaw, pricklypear cactus, saw palmetto, shining sumac, and yaupon. The herbaceous plants are aster, beebalm, crotalaria, blanketflower, blazingstar, goldaster, lupine, morningglory, goldenrod, and sunflower.

This soil is moderately suited to recreational development. The main limitation is the sandy texture of the surface layer. The loose sand makes walking difficult. Because of the slope, recreation areas are limited to a few paths and trails, which should extend across the slope. A plant cover is difficult to establish and maintain, but it can be maintained by controlling heavy traffic and by irrigating. Vehicles are easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is VIIs, and the woodland ordination symbol is 8S.

32—Aqualfs, loamy. This map unit consists of gently sloping excavations from which soil and geologic material have been removed for use in road construction, foundations, and septic tank absorption fields. The excavations have short, steep side slopes. Most areas of this map unit are abandoned, but excavation is continuing in a few places. Those areas that have been excavated below the normal water table generally contain water; and if the areas are large enough, they have been mapped as water.

This map unit is not associated with or confined to a particular kind of soil.

Aqualfs, loamy, do not have an orderly sequence of soil layers. The vegetation consists of pineland threeawn and various weeds.

Most soil properties vary. The seasonal high water table is generally near the surface but varies with the depth of the excavations.

This map unit has not been assigned a land capability classification nor a woodland ordination symbol.

33—Goldhead-Meadowbrook fine sands, depressional. These nearly level, very poorly drained soils are in depressions. They are ponded for 6 to 9 months in most years. The mapped areas range from about 3 to 80 acres. Slopes are smooth and are 0 to 2 percent.

In 92 percent of the areas mapped as Goldhead-Meadowbrook fine sands, depressional, the Goldhead, Meadowbrook, and similar soils make up 75 to 100 percent of the map unit. Dissimilar soils make up 0 to 25 percent. They generally are in areas less than 5 acres in size.

Generally, the mapped areas are about 64 percent Goldhead and similar soils, 27 percent Meadowbrook soils, and 9 percent dissimilar soils. The soils in this map unit are so intermingled that it is not practical to map them separately at the scale used. The proportions and patterns of Goldhead, Meadowbrook, and similar soils, however, are relatively consistent in most areas.

Typically, the surface layer of the Goldhead soil is fine sand about 8 inches thick. It is very dark gray in the upper part and dark gray in the lower part. The subsurface layer is fine sand to a depth of about 19 inches. It is light brownish gray in the upper part and dark gray in the lower part. The subsoil is sandy clay loam to a depth of about 80 inches. It is light gray in the upper part, dark gray in the next part, and gray in the lower part. Some soils occurring in areas of this map unit are similar to the Goldhead soil but have a subsoil that is within 20 inches of the surface.

Typically, the surface layer of the Meadowbrook soil is black fine sand about 6 inches thick. The subsurface layer, to a depth of about 55 inches, is dark brownish gray fine sand. The upper part of the subsoil, to a depth of about 68 inches, is grayish brown fine sandy loam. The lower part, to a depth of about 80 inches or more, is grayish brown sandy clay loam.

Included in this map unit are small areas of dissimilar soils. These are Croatan soils, which are in depressions, and some soils that have 8 to 16 inches of organic material underlain by thin, sandy layers over a loamy subsoil.

Permeability of the Goldhead and Meadowbrook soils in this map unit is rapid in the surface and subsurface layers, moderate in the upper part of the subsoil, and moderately slow in the lower part. The available water capacity is low in the surface and subsurface layers and moderate in the subsoil. These soils dry slowly after periods of heavy rainfall. They are low in natural fertility.

The natural vegetation consists of baldcypress, pond pine, and sweetgum. The understory includes ferns, water grasses, and St Johnswort.

These soils generally are very poorly suited to pine trees. Under natural conditions, however, they are suited to cypress and hardwoods. The major management concern is the high water table, which causes seedling mortality. The water table and the high organic matter content in the surface layer prevent the use of heavy equipment. Adequate drainage outlets generally are not available; therefore, drainage is not practical in these areas.

These soils are very poorly suited to pasture, to cultivated crops, and to urban or recreational development because of the ponding.

These soils provide habitat that is very important for wildlife refuge areas and turkey roosting areas. They also provide good habitat for waterfowl and wading birds. Aquatic animals inhabit the area in large numbers. The permanent residents of cypress heads are relatively few, but most of the wildlife on flatwoods is dependent on ponds for breeding purposes.

The land capability classification is VIIw. These soils have not been assigned a woodland ordination symbol.

34—Croatan muck, frequently flooded. This nearly level, very poorly drained soil is along the tributaries of major streams and in drainageways. It is frequently flooded for very long periods during most years. The mapped areas range from about 3 to 100 acres. Slopes are smooth or concave and are 0 to 2 percent.

In 87 percent of the areas mapped as Croatan muck, frequently flooded, Croatan and similar soils make up 77 to 97 percent of the map unit. Dissimilar soils make up 3 to 23 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is muck about 24 inches thick. It is dark reddish brown in the upper part and black in the lower part. The underlying material, to a depth of about 65 inches, is olive gray and light olive gray sandy clay loam. Soils occurring in areas of this map unit that are similar to the Croatan soil are Maurepas soils and some soils that have 8 to 16 inches of organic material on the surface. These soils are on the outside edge of drainageways and in depressions.

Included in this map unit are small areas of dissimilar soils. These are Ellabelle, Kingsferry, Leon, and Goldhead soils. Ellabelle, Kingsferry, and Leon soils are in drainageways, and Goldhead soils are on low flats.

Permeability of this Croatan soil is moderately rapid in the organic material and moderately slow in the underlying material. The available water capacity is very high in the organic material and moderate or high in the underlying material. The seasonal high water table is at or near the surface for 4 to 6 months in most years. The soil is high in natural fertility.

This soil is used mainly as woodland. The natural vegetation consists of baldcypress, water tupelo, and pond pine. The understory includes giant gallberry, huckleberry, greenbrier, and bayberry.

This soil is very poorly suited to pine trees. Under natural conditions, however, it is well suited to baldcypress and hardwoods. The major management concern is the high water table, which causes severe seedling mortality. The water table and the high organic matter content in the surface layer prevent the use of heavy equipment. Adequate drainage outlets generally are not available; therefore, drainage is not practical in these areas.

This soil is very poorly suited to pasture, to cultivated crops, and to urban or recreational development because of the wetness and the flooding.

This soil provides good habitat for waterfowl, reptiles, and amphibians and for mammals, such as gray squirrels, minks, raccoons, and river otters. Many birds inhabit the area, including the chickadee, titmouse, yellow-billed cuckoo, wood duck, limpkin, acadian flycatcher, owl, hooded warbler, cedar waxwing, woodpecker, and wren. The various hardwoods provide a good source of food and cover for these wildlife species.

The land capability classification is VIIw. This soil has not been assigned a woodland ordination symbol.

36—Boulogne fine sand. This nearly level, poorly drained soil is on flatwoods. The mapped areas range from about 3 to 50 acres. Slopes are smooth and are 0 to 2 percent.

In 99 percent of the areas mapped as Boulogne fine sand, Boulogne and similar soils make up 96 to 100 percent of the map unit. Dissimilar soils make up 0 to 4 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is fine sand about 10 inches thick. It is very dark gray in the upper part and dark gray in the lower part. The upper part of the subsoil, to a depth of about 13 inches, is dark brown fine sand. Separating the upper and lower parts of the subsoil, to a depth of about 33 inches, are buried subsurface layers of fine sand. These layers are grayish brown in the upper part, dark grayish brown in the next part, and light gray in the lower part. The lower part of the subsoil, to a depth of 80 inches or more, is loamy fine sand. In sequence downward, it is dark brown, black, dark reddish brown, and black. Soils occurring in areas of this map unit that are similar to the Boulogne soil are Kingsferry, Leon, and Pottsburg soils and some soils that have a dark subsoil directly below the surface layer and a dark subsoil at a depth of 26 to 34 inches or have a 4- to 6-inch transitional layer of fine sandy loam underlain by a dark subsoil.

Included in this map unit are small areas of dissimilar soils. These are Hurricane and Ridgewood soils, which are on slightly elevated ridges.

Permeability of this Boulogne soil is rapid in the surface layer and buried subsurface layer, moderately rapid in the upper part of the subsoil, and slow or very slow in the lower part. The available water capacity generally is moderate. It is low in the buried surface layer. The seasonal high water table is at a depth of 6 to 18 inches for 1 to 6 months of the year. It recedes to a depth of 12 to 42 inches during prolonged dry periods. The soil is low in natural fertility.

This soil is used mainly as woodland. The natural vegetation consists of water oak, slash pine, and longleaf pine. The understory includes saw palmetto and gallberry. The most common grasses are pineland threeawn, creeping bluestem, chalky bluestem, and other perennial grasses.

This soil is well suited to slash pine and loblolly pine and is moderately suited to longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine and loblolly pine is 70 feet. The potential production is 41 cords per acre for slash pine and 47 cords per acre for loblolly pine *(7)* based on a 25-year rotation. The average site index for longleaf pine is 80 feet. The estimated potential production is 54 cords per acre for longleaf pine based on a 50-year rotation.

If not controlled, the growth of hardwoods will interfere with that of pines; therefore, growing hardwoods could be a less expensive management alternative initially. The main limitations are the wetness and some droughtiness, which cause seedling mortality, restrict equipment use, and increase plant competition. Short-term drainage is needed in some of the wetter areas until the pine's uptake of water lowers the water table, at which time the drains should be blocked. A major management concern is the low available water capacity, which causes severe seedling mortality and retards plant growth. Harvesting and planting operations should be scheduled during dry periods to minimize soil compaction and to minimize root damage during thinning operations. Construction of access roads, logging activities, and site preparation should be avoided in streambeds and adjacent areas because of the hazard of erosion. Chopping should be done late in the fall or in the winter. It should be followed by applications of herbicide in the spring and by burning in the summer. Hand planting can be less expensive than machine planting.

Special site preparation, such as harrowing, bedding, or double bedding, can help to establish seedlings, reduce the seedling mortality rate, and increase the early growth rate. Management practices should include selecting appropriate plants, restricted burning, and leaving debris on the site. Tree limbs and tops should be kept clear of the stream channel because they can block streamflow.

This soil is well suited to pasture. The main limitations are the wetness and the low fertility. The wetness is a limitation affecting the choice of plants that can be grown and the period of grazing. When the soil is wet, grazing causes compaction of the surface layer and damage to the plant community. Excess surface water can be removed from most areas by installing and maintaining field drains. The low available water capacity is a limitation affecting plant growth during extended dry periods. Deep-rooted plants, such as coastal bermudagrass and bahiagrass, are more drought tolerant if fertilizer and lime are added. Proper grazing practices, weed control, and fertilizer are needed to ensure maximum quality of forage.

This soil is poorly suited to cultivated crops. The main limitations are the periodic wetness and droughtiness and the low fertility. Corn and grain sorghum are the best suited crops to plant. The soil is friable, is easy to keep in good tilth, and can be worked throughout a wide range of moisture content. Proper row management, lateral ditches or tile drains, and properly constructed outlets remove the excess surface water. Returning crop residue to the soil or regularly adding other organic matter will improve fertility, reduce crusting, and increase the water infiltration rate. Frequent applications of fertilizer and lime generally are needed.

This soil provides good habitat for deer, quail, turkeys, skunks, opossums, and raccoons. It provides fair habitat for squirrels and poor habitat for doves. Wildlife in the urban areas consists mostly of birds. The areas of this soil that have been left in native vegetation provide a good source of food, cover, and escape routes for most wildlife.

This soil is poorly suited to urban development. The main limitation is the wetness. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of water supplies resulting from seepage. Septic tank absorption fields are mounded in most areas. Drainage is needed if roads and building foundations are constructed. Establishing vegetation commonly is difficult on steep channel side slopes and on fertile spoil. Special techniques may be required. Unless vegetation is established, erosion and sedimentation commonly are problems in some water management systems. Wind erosion is a problem in unvegetated areas and is especially severe in the spring.

Native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of American holly, cabbage palm, common persimmon, live oak, longleaf pine, water oak, and slash pine. The shrubs include American beautyberry, coontie, coralbean, partridge pea, saw palmetto, pawpaw, shining sumac, tarflower, and southern waxmyrtle. The herbaceous plants and vines are blazingstar, Catesby lily, grassleaf goldaster, hibiscus, iris, meadow beauty, sunflower, and zephyr lily.

This soil is poorly suited to recreational development. The main limitations are the wetness and the sandy texture of the surface layer. The loose sand makes walking difficult. Good drainage is needed for paths and trails. Vehicles are easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is IIIw, and the woodland ordination symbol is 8W.

37—Meggett loamy fine sand. This nearly level, poorly drained soil is on broad, low flats. Excess water ponds in the low-lying areas for short periods after heavy rainfall. The mapped areas range from about 3 to 350 acres. Slopes are smooth or concave and are 0 to 2 percent.

In 83 percent of the areas mapped as Meggett loamy fine sand, Meggett and similar soils make up 77 to 89 percent of the map unit. Dissimilar soils make up 11 to 23 percent.

Typically, the surface layer is loamy fine sand about 12 inches thick. It is very dark gray in the upper part and dark gray in the lower part. The subsurface layer, to a depth of about 16 inches, is light brownish gray loamy fine sand. The subsoil, to a depth of 80 inches or more, is, in sequence downward, grayish brown sandy clay, gray clay, and light olive gray clay. Some soils occurring in areas of this map unit are similar to the Meggett soil but the upper 20 inches of the subsoil has an average texture of sandy clay loam and is underlain by sandy clay and clay. In areas where these similar soils are rarely flooded, they have a fine sand surface layer.

Included in this map unit are small areas of dissimilar soils. These are Brookman, Goldhead, and Buccaneer soils. Brookman and Goldhead soils are in lower positions on the landscape than the Meggett soil. Buccaneer soils are in drainageways. Also included are other Meggett soils in depressions and some soils that have a loamy subsoil within 20 inches of the surface.

Permeability of this Meggett soil is moderately rapid in the upper part of the soil and slow in the lower part. The available water capacity is moderate in the surface and subsurface layers and moderate or high in the subsoil. The seasonal high water table is within 12 inches of the surface for 3 to 6 months of the year. The soil is low in natural fertility.

This soil is used mainly as woodland. In a few areas it is used for pasture.

The natural vegetation consists of slash pine, loblolly pine, and sweetgum. The understory includes giant cane, inkberry, and gallberry. The most common grasses are pineland threeawn, pinehill bluestem, little bluestem, broomsedge bluestem, longleaf uniola, sedges, and plumegrass.

This soil is well suited to slash pine and loblolly pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. The average site quality rating is 70 feet for slash pine and 65 feet for loblolly pine. The potential production is 34 cords per acre for slash pine and 47 cords per acre for loblolly pine *(7)* based on a 25-year rotation.

If not controlled, the growth of hardwoods will interfere with that of pines; therefore, growing hardwoods could be a less expensive management alternative initially. The main concern in management for producing and harvesting timber is the seasonal high water table. Special site preparation, such as harrowing, bedding, or double bedding, can help to establish seedlings, reduce the seedling mortality rate, and increase the early growth rate. Bedding should be planned so that it does not impair natural surface drainage. Short-term drainage is needed on some of the wetter sites until the pine's uptake of water lowers the water table, at which time the drains should be blocked. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during dry periods help to overcome the equipment limitation.

Site preparation, such as roller chopping, burning, applications of herbicide, and bedding, can reduce the amount of debris, control immediate plant competition, and facilitate planting. Hand planting methods can be used when the soil is too wet to support heavy equipment. Hardwood understory can be reduced by controlled burning, applying herbicide, or girdling or cutting of the unwanted trees. Chopping should be done late in the fall or in the winter. It should be followed by applications of herbicide in the spring and by burning in the summer. Construction of access roads, logging activities, and site preparation should be avoided in streambeds and adjacent areas because of the hazard of erosion. Tree limbs and tops should be kept clear of the stream channel because they can block streamflow.

This soil is well suited to pasture. The wetness is a limitation affecting the plant species that can be grown and the period of grazing. Excess surface water can be removed from most areas by installing and maintaining field drains. Coastal bermudagrass, improved bahiagrass, and white clover are the best suited pasture plants. Proper stocking rates and restricted grazing during wet periods help to keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is poorly suited to cultivated crops. The main limitation is the seasonal high water table. Grain sorghum and corn are the best suited crops to plant. If adequate drainage outlets are available, lateral ditches and tile drains can be used to lower the water table. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility and tilth. Frequent applications of fertilizer and lime generally are needed.

This soil provides good habitat for deer, quail, turkeys, skunks, opossums, and raccoons. It provides fair habitat for squirrels and poor habitat for doves. Wildlife in the urban areas consists mostly of birds. The areas of this soil that have been left in native vegetation provide a good source of food, cover, and escape routes for most wildlife.

This soil is poorly suited to urban development. The main limitations are the seasonal high water table and slow permeability. Drainage is needed if roads and building foundations are constructed. Establishing vegetation commonly is difficult on steep channel side slopes and infertile spoil. Special techniques may be required. The slow permeability and the high water table increase the possibility that septic tank absorption fields will not function properly. Septic tank absorption fields should be mounded. Unless vegetation is established, erosion and sedimentation commonly are problems in some water management systems. Wind erosion is a problem in unvegetated areas and is especially severe in the spring.

Native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of American holly, cabbage palm, common persimmon, live oak, longleaf pine, water oak, and slash pine. The native shrubs include American beautyberry, coontie, coralbean, partridge pea, pawpaw, saw palmetto, shining sumac, tarflower, and southern waxmyrtle. The herbaceous plants and vines are blazingstar, Catesby lily, grassleaf goldaster, hibiscus, iris, meadow beauty, sunflower, and zephyr lily.

This soil is poorly suited to recreational development. The main limitation is the seasonal high water table. Good drainage is needed for paths and trails. Vehicles are easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is IVw, and the woodland ordination symbol is 9W.

38—Meggett fine sandy loam, rarely flooded. This nearly level, poorly drained soil is on broad, low flats. It is subject to flooding on rare occasions. The mapped areas range from about 3 to 30 acres in size. Slopes are smooth or concave and are 0 to 2 percent.

In 93 percent of the areas mapped as Meggett fine sandy loam, rarely flooded, Meggett and similar soils make up 87 to 99 percent of the map unit. Dissimilar soils make up 1 to 13 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is very dark gray fine sandy loam about 4 inches thick. The subsurface layer, to a depth of about 11 inches, is dark gray loamy fine sand. The subsoil extends to a depth of about 80 inches. It is gray sandy clay in the upper part, gray clay in the next part, and light olive gray clay in the lower part. Some soils occurring in areas of this map unit are similar to the Meggett soil but have a surface layer that is loamy fine sand and a subsoil that is sandy clay loam in the upper part.

Included in the map unit are small areas of dissimilar soils. These are Brookman, Meggett, Goldhead, and Buccaneer soils. Brookman soils are in depressions. Meggett and Goldhead soils are on broad, low flats and in depressions. Buccaneer soils are in drainageways.

Permeability of this Meggett soil is moderately rapid in the upper part of the soil and very slow or slow in the lower part. The available water capacity is moderate in the surface and subsurface layers and moderate or high in the subsoil. The seasonal high water table is within 6 inches of the surface for 4 to 8 months of the year. The soil is low in natural fertility.

This soil is used mainly as woodland and for pasture.

The natural vegetation consists of slash pine, loblolly pine, cabbage palm, and red maple. The understory includes inkberry. The most common grasses are sawgrass, maidencane, hairy panicum, panicum, southern bayberry, and little bluestem.

This soil is well suited to slash pine and loblolly pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. The average site quality rating for slash pine and loblolly pine is 70 feet. The potential production is 41 cords per acre for slash pine and 47 cords per acre for loblolly pine *(7)* based on a 25-year rotation.

If not controlled, the growth of hardwoods will interfere with that of pines; therefore, growing hardwoods could be a less expensive management alternative initially. The main concern in management for producing and harvesting timber is the seasonal high water table. Special site preparation, such as harrowing, bedding, or double bedding on poorly drained soils, can help to establish seedlings, reduce the seedling mortality rate, and increase the early growth rate. Bedding should be planned so that it does not impair natural surface drainage. Short-term drainage is needed in some of the wetter areas until the pine's uptake of water lowers the water table, at which time the drains should be blocked. Using tracks or floatation tires on planting and harvesting machinery and scheduling planting and harvesting operations during dry periods help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations.

Site preparation, such as roller chopping, burning, applications of herbicide, and bedding, can reduce the amount of debris, control immediate plant competition, and facilitate planting. Hand planting methods can be used when the soil is too wet to support heavy equipment. Hardwood understory can be reduced by controlled burning, applications of herbicide, or girdling or cutting of the unwanted trees. Chopping should be done late in the fall or in the winter. It should be followed by applications of herbicide in the spring and by burning in the summer. Management practices should include selection of appropriate plants and applications of fertilizer during planting operations. Construction of access roads, logging activities, and site preparation should be avoided in streambeds and adjacent areas because of the hazard of erosion. Tree limbs and tops should be kept clear of the stream channel because they can block streamflow.

This soil is well suited to pasture. The periodic wetness is a limitation affecting the plant species that can be grown and the period of grazing. Excess surface water can be removed from most areas by installing and maintaining field drains. Coastal bermudagrass, improved bahiagrass, and white clover are the best suited pasture plants. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is poorly suited to cultivated crops. The main limitation is the wetness. Grain sorghum and corn are the best suited crops to plant. If adequate drainage outlets are available, lateral ditches and tile drains can be used to lower the water table. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility and tilth. Frequent applications of fertilizer and lime generally are needed.

This soil provides good habitat for deer, quail, turkeys, bobcats, skunks, opossums, and raccoons. It provides fair habitat for squirrels and poor habitat for doves. Wildlife in the urban areas consists mostly of birds. The areas of this soil that have been left in native vegetation provide a good source of food, cover, and escape routes for most wildlife.

This soil is poorly suited to urban development. The main limitations are the seasonal high water table and slow permeability. Drainage is needed if roads and building foundations are constructed. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of water supplies resulting from seepage. Septic tank absorption fields are mounded in most areas. Effluent can surface in downslope areas and create a health hazard. Establishing vegetation commonly is difficult on steep channel side slopes and on fertile spoil. Special techniques may be required. Unless vegetation is established, erosion and sedimentation commonly are problems in some water management systems. Wind erosion is a problem in unvegetated areas and is especially severe in the spring.

Native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of American holly, cabbage palm, common persimmon, live oak, longleaf pine, water oak, and slash pine. The native shrubs include American beautyberry, coontie, coralbean, partridge pea, pawpaw, saw palmetto, shining sumac, tarflower, and southern waxmyrtle. The herbaceous plants and vines are blazingstar, Catesby lily, grassleaf goldaster, hibiscus, iris, meadow beauty, sunflower, and zephyr lily.

This soil is poorly suited to recreational development. The main limitation is the periodic wetness. Good drainage is needed for paths and trails. Vehicles are easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is IVw, and the woodland ordination symbol is 13W.

39—Evergreen-Leon mucks, depressional. These nearly level, very poorly drained soils are in depressions. They are ponded for 9 to 12 months in most years. The mapped areas range from about 3 to 125 acres. Slopes are smooth or concave and are 0 to 2 percent.

In 100 percent of the areas mapped as Evergreen-Leon mucks, depressional, Evergreen, Leon, and similar soils make up 100 percent of the map unit.

Generally, the mapped areas are about 64 percent Evergreen and similar soils and about 36 percent Leon and similar soils. The soils in this map unit are so intermingled that it is not practical to map them separately at the scale used. The proportions and patterns of Evergreen, Leon, and similar soils, however, are relatively consistent in most areas.

Typically, the surface layer of the Evergreen soil extends to a depth of about 17 inches. It is black muck in the upper part, black loamy fine sand in the next part, and very dark gray fine sand in the lower part. The subsurface layer, to a depth of about 26 inches, is light brownish gray fine sand. The subsoil, to a depth of about 80 inches, is dark reddish brown loamy fine sand in the upper part and dark reddish brown fine sand in the lower part. Some soils occurring in areas of this map unit are similar to the Evergreen soil but generally have more than 16 inches of organic material where they are in the center of the delineations.

Typically, the surface layer of the Leon soil extends to a depth of about 8 inches. It is black muck in the upper part and black fine sand in the lower part. The subsurface layer, to a depth of about 17 inches, is light brownish gray fine sand. The subsoil, to a depth of about 83 inches, is dark reddish brown loamy fine sand in the upper part and dark reddish brown fine sand in the lower part. Soils occurring in areas of this map unit that are similar to the Leon soil are Kingsferry and Rutlege soils.

Permeability of these Evergreen and Leon soils is rapid in the organic layer and in the surface and subsurface layers and moderate in the subsoil. The available water capacity is very high in the organic layers and very low or low in the mineral layers. The seasonal high water table is at or above the surface during most of the year. These soils are high in natural fertility.

These soils are used mostly as woodland. The natural vegetation consists of baldcypress and pond pine. The understory includes large gallberry, ferns, water grasses, huckleberry, greenbrier, and southern bayberry.

These soils are very poorly suited to pine trees. Under natural conditions, however, they are suited to cypress and hardwoods. The major management concern is the high water table, which causes seedling mortality. The water table and the high organic matter content in the surface layer prevent the use of heavy equipment. Adequate drainage outlets generally are not available; therefore, drainage is not practical.

These soils are very poorly suited to pasture, to cultivated crops, and to urban and recreational development because of the ponding.

These soils provide habitat that is very important for wildlife refuge areas and turkey roosting areas. They also provide very good habitat for waterfowl and wading birds. Aquatic animals inhabit the area in large numbers. The permanent residents of cypress heads are relatively few, but most of the wildlife on flatwoods is dependent on these ponds for breeding purposes.

The land capability classification of this map unit is VIIw. These soils have not been assigned a woodland ordination symbol.

40—Brookman mucky fine sandy loam, depressional. This nearly level, very poorly drained soil is in depressions. It is ponded for 6 to 9 months in most years. The mapped areas range from about 3 to 25 acres in size. Slopes are smooth or convex and are 0 to 2 percent.

In 90 percent of the areas mapped as Brookman mucky fine sandy loam, depressional, Brookman and similar soils make up 79 to 100 percent of the map unit. Dissimilar soils make up 0 to 21 percent. They generally are in areas less than 5 acres in size.

Typically, the surface layer is black mucky fine sandy loam about 8 inches thick. The subsoil extends to a depth of about 80 inches. In sequence downward, it is black sandy clay loam, very dark gray sandy clay, dark gray clay, and light olive gray clay. Soils occurring in areas of this map unit that are similar to the Brookman soil are Meggett and Buccaneer soils and some soils that have a surface layer that is covered with 2 to 6 inches of organic material.

Included in this map unit are small areas of dissimilar soils. These are Croatan and Goldhead soils, which are on broad, low flats and in depressions.

Permeability of this Brookman soil is moderate in the surface and subsurface layers and slow in the subsoil. The available water capacity is high in the surface layer and subsoil. In most years undrained areas are ponded for 6 to 9 months of the year. The soil dries slowly after periods of heavy rainfall. It is low in natural fertility.

This soil is used mainly as woodland. The natural vegetation consists of cypress, sweetgum, and pond pine. The understory includes sourwood, fern, greenbrier, switchgrass, giant gallberry, and American holly.

This soil is generally very poorly suited to pine trees. Under natural conditions, however, it is suited to cypress and hardwoods. The major management concern is the high water table, which causes severe seedling mortality. The high water table and the high organic matter content in the surface layer prevent the use of heavy equipment. Adequate drainage outlets generally are not available; therefore, drainage is not practical.

This soil is very poorly suited to pasture, to cultivated crops, and to urban or recreational development because of the ponding.

This soil provides habitat that is very important for wildlife refuge areas and turkey roosting areas. It provides good habitat for waterfowl and wading birds. Aquatic animals inhabit the area in large numbers. The various hardwoods provide a good source of food and cover for the wildlife.

The land capability classification is VIIw. This soil has not been assigned a woodland ordination symbol.

44—Corolla fine sand, 2 to 6 percent slopes, rarely flooded. This gently sloping to sloping, moderately well drained and somewhat poorly drained soil is on narrow, dunelike ridges along the Atlantic coast. It is subject to flooding on rare occasions during prolonged, high-intensity storms. The mapped areas range from about 3 to 500 acres in size. Slopes are convex or concave.

In 93 percent of the areas mapped as Corolla fine sand, 2 to 6 percent slopes, rarely flooded, Corolla and similar soils make up 72 to 100 percent of the map unit. Dissimilar soils make up 0 to 28 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is very pale brown fine sand about 6 inches thick. The underlying material, to a depth of about 80 inches, is fine sand. In sequence downward, it is pale brown, light yellowish brown, pale brown, and light gray. Some soils occurring in areas of this map unit are similar to the Corolla soil but are slightly better drained where the slope is more than 6 percent or where dunes occur.

Included in this map unit are small areas of dissimilar soils. These are Newhan soils and Beaches. Newhan soils are on dunes.

Permeability of this Corolla soil is very rapid. The available water capacity is very low. In most years the seasonal high water table is at a depth of 18 to 36 inches for 2 to 6 months of the year. It is below a depth of 36 inches during prolonged dry periods. The soil is very low in natural fertility.

This soil is used mainly for urban development.

The natural vegetation consists of waxmyrtle and live oak. The most common grasses are seaoats, bitter panicum, woody beachheather, coastal lovegrass, seabeach eveningprimrose, maritime groundcherry, and bushy bluestem.

This soil is not suited to pine trees, to pasture, or to cultivated crops because of ocean salt spray.

This soil provides good habitat for a variety of shorebirds, such as gulls and terns, and crustaceans, such as crabs and turtles. The native grasses and legumes provide a good source of food and nesting sites. The areas of this soil that have been left in native vegetation provide a good source of food, cover, and escape routes for most wildlife.

This soil is poorly suited to urban development. The main limitations are the wetness and a poor filtering capacity. The flooding is a hazard. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of water supplies resulting from seepage. Septic tank absorption fields are mounded in most areas. Areas adjacent to the water are subject to coastal dune erosion, especially if construction alters the natural processes and destroys excessive amounts of native vegetation.

Vegetation is difficult to establish because the soil is infertile, coarse textured, droughty, and saline and because of the salt spray. Intensive management practices, including irrigation during dry periods, are needed to establish and maintain vegetation on this soil. Native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of cabbage palm, Chickasaw plum, live oak, redbay, red cedar, slash pine, magnolia, and sand pine. The native shrubs include beargrass, pricklypear cactus, coontie, coralbean, yaupon, lantana, marshelder, partridge pea, oats, saw palmetto, Spanish bayonet, and waxmyrtle. The native grasses include seaoats, marshhay cordgrass, bitter panicum, seashore saltgrass, gulf bluestem, seashore paspalum, seashore dropseed, common bermudagrass, and shoredune panicum. The herbaceous plants and vines are morningglory, fiddler leaf morningglory, blanketflower, largeleaf pennywort, sea purslane, greenbrier, and wild grape.

This soil is poorly suited to recreational development. The main limitation is the sandy texture. The flooding is a hazard. Because of the slope, recreation areas are limited to a few paths and trails, which should extend across the slope. A plant cover is difficult to establish and maintain, but it can be maintained by controlling heavy traffic. Vehicles are easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is VIIs. This soil has not been assigned a woodland ordination symbol.

45—Meggett loamy fine sand, depressional. This nearly level, very poorly drained soil is in depressions and is ponded for 6 to 9 months in most years. The mapped areas range from about 3 to 50 acres. Slopes are less than 1 percent.

In 89 percent of the areas mapped as Meggett loamy fine sand, depressional, Meggett and similar soils make up 81 to 98 percent of the map unit. Dissimilar soils make up about 2 to 19 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is dark gray loamy fine sand about 9 inches thick. The subsurface layer, to a depth of about 18 inches, is light brownish gray loamy fine sand. The subsoil extends to a depth of about 80 inches. It is grayish brown sandy clay in the upper part and gray clay in the lower part. Some soils occurring in areas of this map unit are similar to the Meggett soil but are covered with 2 to 6 inches of organic material and have a subsoil at a depth of more than 20 inches. These soils are on the outer edge of the depressions.

Included in this map unit are small areas of dissimilar soils. These are Brookman soils, which are in the center of the depressions.

Permeability of this Meggett soil is moderately rapid in the surface and subsurface layers and slow in the subsoil. The available water capacity is moderate in the surface layer and the subsoil and low in the subsurface layer. The soil dries slowly after periods of heavy rainfall. It is low in natural fertility.

This soil is used mainly as woodland. The natural vegetation consists of pond pine and cypress. The understory includes pondweed and ferns.

This soil generally is not suited to pine trees. Under natural conditions, however, it is suited to cypress and hardwoods. The major management concern is the high water table, which causes severe seedling mortality. The water table and the high organic matter content in the surface layer prevent the use of heavy equipment. Adequate drainage outlets generally are not available; therefore, drainage is not practical in these areas.

This soil is very poorly suited to pasture, to cultivated crops, and to urban and recreational development because of the ponding.

This soil provides habitat that is very important for wildlife refuge areas and turkey roosting areas. It provides good habitat for waterfowl and wading birds. Aquatic animals inhabit the area in large numbers. The various hardwoods provide a good source of food and cover for the wildlife.

The land capability classification is VIIw. This soil has not been assigned a woodland ordination symbol.

46—Buccaneer clay, rarely flooded. This nearly level, very poorly drained soil is on slightly elevated, broad, low flats. It is subject to flooding on rare occasions. Water ponds in low-lying areas after periods of heavy rainfall. The mapped areas range from about 3 to 100 acres. Slopes are smooth and are 0 to 2 percent.

In 92 percent of the areas mapped as Buccaneer clay, rarely flooded, Buccaneer and similar soils make up 77 to 100 percent of the map unit. Dissimilar soils make up 0 to 23 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is black clay about 5 inches thick. The subsoil to a depth of about 65 inches is clay. It is very dark gray in the upper part, dark gray in the next part, and gray in the lower part. The substratum, to a depth of about 80 inches, is light olive gray clay. Brookman soils, which are similar to the Buccaneer soil, are in areas of this map unit.

Included in this map unit are small areas of dissimilar soils. These are Meggett soils, which are in higher positions on the landscape than the Buccaneer soil.

Permeability of this Buccaneer soil is slow in the upper part of the soil and very slow in the lower part. The available water capacity is high or very high. The seasonal high water table is within 6 inches of the surface for 6 to 9 months of the year. The soil is medium in natural fertility.

This soil is used mainly as woodland. The natural vegetation consists of loblolly pine, cabbage palm, red maple, and willow oak. The understory includes waxmyrtle. The most common grasses are little bluestem, slender bluestem, and panicum.

This soil generally is very poorly suited to pine trees. Under natural conditions, however, it is suited to cypress and hardwoods. The major management concern is the high water table, which causes seedling mortality. The water table and the high organic matter content in the surface layer prevent the use of heavy equipment. Adequate drainage outlets generally are not available; therefore, drainage is not practical.

This soil is well suited to pasture. The wetness is a limitation affecting the plant species that can be grown and the period of grazing. Excess surface water can be removed from most areas by installing and maintaining field drains. Coastal bermudagrass, improved bahiagrass, and white clover are the best suited pasture plants. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Fertilizer is needed for optimum growth of grasses and legumes.

This soil is poorly suited to cultivated crops. The main limitation is the periodic wetness.

This soil provides good habitat for deer, bobcats, skunks, opossums, raccoons, quail, and turkeys and for many birds, particularly warblers. It provides fair habitat for squirrels and poor habitat for doves. Wildlife in the urban areas consists mostly of birds. The areas of this soil that have been left in native vegetation provide a good source of food, cover, and escape routes for most wildlife.

This soil is poorly suited to urban development. The main limitations are the seasonal high water table and very slow permeability. The native trees consist of American holly, cabbage palm, common persimmon, live oak, longleaf pine, water oak, and slash pine. The native shrubs include American beautyberry, coontie, coralbean, partridge pea, pawpaw, saw palmetto, shining sumac, tarflower, and southern waxmyrtle. The herbaceous plants are blazingstar, Catesby lily, grassleaf goldaster, hibiscus, iris, meadow beauty, sunflower, and zephyr lily.

This soil is poorly suited to recreational development. The main limitation is the seasonal high water table. Good drainage is needed for paths and trails. Vehicles are easily mired down.

The land capability classification is IIIw, and the woodland ordination symbol is 13W.

47—Leefield fine sand, 0 to 5 percent slopes. This nearly level and gently sloping, somewhat poorly drained soil is on narrow to broad ridges and isolated knolls. The mapped areas range from about 3 to 50 acres. Slopes are smooth or concave.

In 94 percent of the areas mapped as Leefield fine sand, 0 to 5 percent slopes, Leefield and similar soils make up 91 to 98 percent of the map unit. Dissimilar soils make up 2 to 9 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is gray fine sand about 5 inches thick. The subsurface layer extends to a depth of about 29 inches. It is light yellowish brown fine sand in the upper part, pale yellow fine sand in the next part, and brownish yellow loamy fine sand in the lower part. The subsoil extends to a depth of about 80 inches. It is light yellowish brown fine sandy loam that has plinthite in the upper part and is light gray sandy clay loam in the lower part. Soils occurring in areas of this map unit that are similar to the Leefield soil are Ocilla soils and some soils that are moderately well drained and are near drainageways.

Included in this map unit are small areas of dissimilar soils. These are Albany and Goldhead soils. Albany soils are in positions on the landscape similar to those of the Leefield soil. Goldhead soils are on flatwoods.

Permeability of this Leefield soil is rapid in the surface and subsurface layers, moderate in the upper part of the subsoil, and moderately slow in the lower part. The available water capacity is very low or low in the surface and subsurface layers and low or moderate in the subsoil. The seasonal high water table is at a depth of 18 to 30 inches for 2 to 4 months of the year and at a depth of 30 to 50 inches for 3 to 6 months or more. The soil is low in natural fertility.

This soil is used mainly as woodland. It is also used for pasture.

The natural vegetation consists of longleaf pine, slash pine, turkey oak, and live oak. The understory includes gallberry. The most common grasses are pineland threeawn, panicum, toothachegrass, muhly, switchgrass, and various bluestems.

This soil is well suited to slash pine and loblolly pine and is moderately suited to longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine and loblolly pine is 65 feet. The potential production is 34 cords per acre for slash pine and 42 cords per acre for loblolly pine *(7)* based on a 25-year rotation. The average site index for longleaf pine is 70 feet. The estimated potential production is 43 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are seedling mortality, the equipment limitation, and plant competition. Using tracks or floatation tires on the planting and harvesting machinery and scheduling harvesting and planting operations during dry periods help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations. Measures that reduce the hazard of erosion are needed when timber is harvested. Construction of access roads, logging activities, and site preparation should be avoided in streambeds and adjacent areas because of the hazard of erosion. Tree limbs and tops should be kept clear of the stream channel because they can block streamflow. Stream crossing should be avoided if possible. Culverts and bridges may be needed.

Site preparation, such as roller chopping, burning, applications of herbicide, and bedding, can reduce the amount of debris, control immediate plant competition, and facilitate planting. Special site preparation, such as harrowing, bedding, or double bedding, can help to establish seedlings, reduce the seedling mortality rate, and increase the early growth rate. Bedding should be planned so that it does not impair natural surface drainage. Conventional harvesting methods generally can be used, but their use can be limited during rainy periods, generally from June to September. Management practices include selecting appropriate plants, applying fertilizer during planting operations, and leaving debris on the site.

This soil is well suited to pasture. When the soil is wet, grazing causes compaction of the surface layer and damage to the plant community. Excess surface water can be removed from most areas by installing and maintaining field drains.

This soil is moderately suited to cultivated crops. The main limitations are the low fertility and the periodic wetness and droughtiness. If water-control and soil-improving measures are applied, the soil is moderately well suited to most cultivated crops. Corn, grain sorghum, and tobacco are the main crops. The soil is friable, is easy to keep in good tilth, and can be worked throughout a wide range of moisture content. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility and tilth. Frequent applications of fertilizer and lime generally are needed.

This soil provides very good habitat for deer, turkey, squirrel, and many birds. Hardwood mast, such as acorns, nuts, fruits, buds, and berries, is a good source of food for wildlife. The mature hardwoods and snags provide good nesting sites for birds. The soil also provides good habitat for raccoons, opossums, bobwhite quail, and doves. It provides fair habitat for reptiles and poor habitat for most amphibians. Wildlife in the urban areas consists mostly of birds. The areas of this soil that have been left in native vegetation provide a good source of food, cover, and escape routes for most wildlife.

This soil is moderately suited to urban development. The main limitations are the periodic wetness and droughtiness. Drainage is needed if roads and building foundations are constructed. Vegetation is difficult to establish because the soil is infertile, coarse textured, and droughty. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of water supplies resulting from seepage. Septic tank absorption fields are mounded in most areas.

Housing development plans should provide for the preservation of as many trees as possible. Selection of suitable vegetation is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. Native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of American holly, laurelcherry, Chickasaw plum, dogwood, fringetree, hickory, southern magnolia, oak, pine, persimmon, redbud, red maple, red cedar, and sweetgum. The native shrubs include American beautyberry, coralbean, pawpaw, strawberry bush, shining sumac, viburnum, and waxmyrtle. The herbaceous plants and vines are aster, beebalm, blazingstar, iris, and sunflower.

This map unit is poorly suited to recreational development. The main limitations are the wetness and the sandy texture of the surface layer. The loose sand makes walking difficult. Good drainage is needed for paths and trails. A plant cover is somewhat difficult to establish and maintain, but it can be maintained by controlling heavy traffic and by irrigating.

The land capability classification is IIw, and the woodland ordination symbol is 8W.

49—Ousley and Mandarin fine sands, occasionally flooded. These nearly level and gently sloping, somewhat poorly drained and moderately well drained soils are on low terraces and flood plains along the St. Marys River. They are occasionally flooded for brief periods in most years. The mapped areas range from about 3 to 80 acres. Slope is 0 to 5 percent.

In 85 percent of the areas mapped as Ousley and Mandarin fine sands, occasionally flooded, Ousley, Mandarin, and similar soils make up 76 to 94 percent of the map unit. Dissimilar soils make up 6 to 24 percent. They generally are in areas less than 3 acres in size.

Generally, the mapped areas are about 68 percent Ousley and similar soils, 18 percent Mandarin and similar soils, and 14 percent dissimilar soils. Some areas are Ousley and similar soils, some are Mandarin and similar soils, and others are made up of both Ousley and Mandarin soils. Areas of the individual soils are large enough to be mapped separately; however, in considering the present and predicted use, they were mapped as one unit.

The Ousley soil is somewhat poorly drained. Typically, the surface layer is dark gray fine sand about 7 inches thick. The underlying material is fine sand to a depth of about 80 inches. In sequence downward, it is light gray, pale brown, olive yellow, yellow, light yellowish brown, and brown. Osier soils, which are similar to the Ousley soil, are in some areas of this map unit.

The Mandarin soil is somewhat poorly drained. Typically, the surface layer is gray fine sand about 7 inches thick. The subsurface layer, to a depth of about 11 inches, is light brownish gray fine sand. The subsoil, to a depth of about 16 inches, is fine sand. It is dark brown in the upper part and yellowish brown in the lower part. The upper part of the substratum, to a depth of about 23 inches, is brown fine sand and the lower part, to a depth of about 80 inches, is light brownish gray fine sand.

Included in this map unit are small areas of dissimilar soils. These are Albany, Goldhead, and Meadowbrook soils. They are in positions on the landscape similar to those of the Ousley and Mandarin soils.

Permeability of the Ousley soil is rapid. The available water capacity is very low or low. The seasonal high water table is at a depth of 18 to 36 inches for 4 to 6 months each year. The soil is very low in natural fertility.

Permeability of the Mandarin soil is rapid in the surface and subsurface layers and moderate in the subsoil. The available water capacity is very low or low in the surface and subsurface layers and moderate in the subsoil. The seasonal high water table is at a depth of 18 to 42 inches for 4 to 6 months of the year. The soil is very low in natural fertility.

Both of these soils are used mainly as woodland. The natural vegetation consists of slash pine, loblolly pine, longleaf pine, scattered blackjack oak, turkey oak, post oak, willow oak, and red maple. The understory includes gallberry, saw palmetto, running oak, and waxmyrtle. The most common grasses are pineland threeawn, broomsedge bluestem, and panicum.

These soils are poorly suited to slash pine, loblolly pine, and longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine and loblolly pine is 50 to 55 feet. The potential production is 18 to 23 cords per acre for slash pine and 26 to 30 cords per acre for loblolly pine *(7)* based on a 25-year rotation. The average site index for longleaf pine is 60 feet. The estimated potential production is 30 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are seedling mortality, the equipment limitation, and plant competition. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during dry periods help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations. Reducing the hazard of erosion is an essential concern in management when harvesting timber. Construction of access roads, logging activities, and site preparation should be avoided in streambeds and adjacent areas because of the hazard of erosion. Tree limbs and tops should be kept clear of the stream channel because they can block streamflow. Stream crossing should be avoided if possible. Culverts and bridges may be needed.

Site preparation, such as roller chopping, burning, applications of herbicide, and bedding, can reduce the amount of debris, control immediate plant competition, and facilitate planting. Special site preparation, such as harrowing, bedding, or double bedding, can help to establish seedlings, reduce the seedling mortality rate, and increase the early growth rate. If heavy equipment is used during wet periods, the extent of soil compaction will increase. Management practices should include selection of appropriate plants and applications of fertilizer during planting operations. These soils commonly are very low in organic matter content. Harvesting methods that remove all tree biomass from the site further reduce the fertility of these soils. Logging operations should leave residual biomass distributed over the site.

These soils are moderately suited to pasture. The very low fertility and droughtiness are the main limitations. When the soil is wet, grazing causes compaction of the surface layer, poor tilth, and excessive runoff. Excess surface water can be removed from most areas by installing field drains. Coastal bermudagrass and bahiagrass are the best suited pasture plants. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

These soils are moderately well suited to cultivated crops. The main limitations are the periodic wetness and droughtiness. These soils are friable, are easy to keep in good tilth, and can be worked throughout a wide range of moisture content. Land grading and smoothing will improve surface drainage and permit more efficient use of farm equipment. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility and tilth. Frequent applications of fertilizer and lime generally are needed. A good ground cover of close-growing plants between tree rows can reduce the hazard of erosion.

These soils provide good habitat for deer and turkey. Many birds inhabit the area, including warblers, towhee, crested flycatchers, and quail. The areas of this map unit that have been left in native vegetation provide good food sources, nesting sites, cover, and escape routes for most wildlife.

These soils are poorly suited to urban development. The main limitations are the wetness and the sandy texture of the surface layer. The flooding is a hazard. Generally, soils in adjacent, higher-lying areas are better suited to urban development. Roads and streets should be constructed above the expected level of flooding. Major flood-control structures are needed to control flooding. Septic tank absorption fields are mounded in most areas. Effluent can surface in downslope areas and create a health hazard.

These soils are poorly suited to recreational development. The main limitations are the wetness and the sandy texture of the surface layer. The flooding is a hazard. Water-control structures must be constructed and maintained to control flooding and to remove excess surface water. The loose sand makes walking difficult. A plant cover is difficult to establish and maintain. Vehicles are easily mired down.

The land capability classification is IIIw. The woodland ordination symbol is 8W for the Ousley soil and 8S for the Mandarin soil.

50—Blanton fine sand, 12 to 20 percent slopes. This moderately steep, somewhat poorly drained and moderately well drained soil is on side slopes near the St. Marys River. The mapped areas range from about 3 to 80 acres. Slope is 12 to 20 percent.

In 96 percent of the areas mapped as Blanton fine sand, 12 to 20 percent slopes, Blanton and similar soils make up 90 to 100 percent of the map unit. Dissimilar soils make up 0 to 10 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is very dark brown fine sand about 3 inches thick. The subsurface layer, to a depth of about 57 inches, is fine sand. It is brown in the upper part, pale brown in the next part, and light gray in the lower part. The subsoil, to a depth of 80 inches or more, is light brownish gray sandy clay loam. Soils occurring in areas of this map unit that are similar to the Blanton soil are the Albany, Ocilla, Ortega, and Ridgewood soils and some soils that have short, steep slopes.

Included in this map unit are small areas of dissimilar soils. These are Goldhead, Meadowbrook, and Pottsburg soils, which are on the lower part of the side slopes. Also included are other soils that have a yellow loamy subsoil within 20 inches of the surface, that are sandy to a depth of 60 inches, or that have a red loamy subsoil at a depth of 20 to 40 inches.

Permeability of this Blanton soil is rapid in the surface and subsurface layers and moderate in the subsoil. The available water capacity is very low in the surface and subsurface layers and moderate in the subsoil. In most years the seasonal high water table is at a depth of 30 to 48 inches for more than 4 to 8 months of the year. It recedes to a depth of 40 to 60 inches during prolonged dry periods. The soil is low in natural fertility.

This soil is used mainly as woodland. The natural vegetation consists of turkey oak, water oak, slash pine, and longleaf pine. The understory includes gallberry. The most common grasses are pineland threeawn, little bluestem, pinehill bluestem, slender bluestem, panicum, toothachegrass, and switchgrass.

This soil is moderately suited to slash pine, loblolly pine, and longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine and loblolly pine is 55 feet. The potential production is 23 cords per acre for slash pine and 31 cords per acre for loblolly pine *(7)* based on a 25-year rotation. The average site index for longleaf pine is 65 feet. The estimated potential production is 36 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are seedling mortality, the equipment limitation, plant competition, and the erosion hazard. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during dry periods help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations. Construction of access roads, logging activities, and site preparation should be avoided in streambeds and adjacent areas because of the hazard of erosion. Tree limbs and tops should be kept clear of the stream channel because they can block streamflow. To reduce erosion, fire lines and access roads should slope gently to streams and cross at a right angle. Stream crossing should be avoided if possible. Culverts and bridges may be needed. Access roads and water bars on skid trails and fire lines need water turnouts, or broad-based dips, to direct water and sediment away from the roads, water bars, and streams and into the surrounding woods. When the roads are no longer in use, they should be closed and seeded to prevent erosion. Measures that reduce the hazard of erosion are needed when timber is harvested.

Special site preparation, such as harrowing, bedding, or double bedding, can help to establish seedlings, reduce the seedling mortality rate, and increase the early growth rate. Conventional harvesting methods generally are difficult to use on this soil because of the slope; however, they can be used in the more gently sloping areas. The high-lead logging method is more efficient than most other methods and is less damaging to the soil surface. Mechanically planting trees on the contour helps to control erosion. A major management concern is the very low available water capacity, which causes severe seedling mortality and retards plant growth. Management practices should include selection of appropriate plants and applications of fertilizer during planting operations.

This soil is very poorly suited to pasture or to cultivated crops because of the low fertility, the droughtiness, and the slope.

This soil provides a very good habitat for deer, turkey, squirrel, and many birds. Hardwood mast, such as acorns, nuts, fruits, buds, and berries, is a good source of food for wildlife. The mature hardwoods and snags provide good nesting sites for birds. The soil also provides good habitat for raccoons, opossums, bobwhite quail, and doves. It provides fair habitat for reptiles and poor habitat for most amphibians.

This soil is very poorly suited to urban development and poorly suited to recreational development. The main limitation is the steep slope. Because of the slope, recreation areas are limited to a few paths and trails, which should extend across the slope. Erosion and sedimentation can be controlled, and the esthetic value of the area can be enhanced by maintaining adequate plant cover.

The land capability classification is VIs, and the woodland ordination symbol is 11S.

51—Albany fine sand, 0 to 5 percent slopes. This nearly level and gently sloping, somewhat poorly drained soil is on narrow to broad ridges and isolated knolls. The mapped areas range from about 3 to 50 acres. Slopes are smooth or concave.

In 86 percent of the areas mapped as Albany fine sand, 0 to 5 percent slopes, Albany and similar soils make up 80 to 92 percent of the map unit. Dissimilar soils make up 8 to 20 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is very dark gray fine sand about 2 inches thick. The subsurface layer, to a depth of about 50 inches, is fine sand. It is yellowish brown in the upper part, light yellowish brown in the next part, and light gray in the lower part. The subsoil, to a depth of about 80 inches, is yellowish brown fine sandy loam in the upper part, grayish brown sandy clay loam in the next part, and olive gray fine sandy loam in the lower part. Ridgewood soils, which are similar to the Albany soil, are in areas of this map unit.

Included in this map unit are small areas of dissimilar soils. These are Blanton, Hurricane, Leefield, Leon, Ocilla, Meadowbrook, and Sapelo soils. Blanton soils are on the higher ridges. Leefield, Ocilla, and Hurricane soils are in positions on the landscape similar to those of the Albany soil. Leon and Sapelo soils are on flatwoods. Meadowbrook soils are on broad, low flats.

Permeability of this Albany soil is rapid in the surface and subsurface layers and moderately slow in the subsoil. The available water capacity is very low in the surface and subsurface layers and moderate in the subsoil. The seasonal high water table is at a depth of 12 to 30 inches for 1 to 4 months of the year. The soil is very low in natural fertility.

This soil is used mainly as woodland. In a few areas it is used for pasture.

The natural vegetation consists of longleaf pine, slash pine, water oak, turkey oak, and live oak. The understory includes gallberry. The most common grasses are pineland threeawn, little bluestem, pinehill bluestem, slender bluestem, panicum, toothachegrass, and switchgrass.

This soil is well suited to slash pine and loblolly pine and is moderately suited to longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine and loblolly pine is 60 feet. The potential production is 28 cords per acre for slash pine and 36 cords per acre for loblolly pine *(7)* based on a 25-year rotation. The average site index for longleaf pine is 70 feet. The estimated potential production is 43 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are seedling mortality, the equipment limitation, and plant competition. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during dry periods help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations. With proper management, trees can be harvested during the wetter periods. Construction of access roads, logging activities, and site preparation should be avoided in streambeds and adjacent areas because of the hazard of erosion. Tree limbs and tops should be kept clear of the stream channel because they can block streamflow. Stream crossing should be avoided if possible. Culverts and bridges may be needed.

Site preparation, such as chopping, burning, applications of herbicide, and bedding, can reduce the amount of debris, control immediate plant competition, and facilitate planting. Special site preparation, such as harrowing and bedding, can help to establish seedlings, reduce the seedling mortality rate, and increase the early growth rate. Bedding should be planned so that it does not impair natural surface drainage. Conventional harvesting methods generally can be used, but their use should be limited during rainy periods, generally from June to September. Management practices should include selecting appropriate plants, applying fertilizer during planting operations, and leaving debris on the site.

This soil is moderately suited to pasture. Droughtiness and the very low fertility are the main limitations. When the soil is wet, grazing causes compaction of the surface layer and damage to the plant community. Excess surface water can be removed from most areas by installing and maintaining field drains. Coastal bermudagrass and bahiagrass are the best suited pasture plants. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is moderately suited to cultivated crops. The main limitations are the periodic wetness and droughtiness and the very low fertility. If water-control and soil-improving measures are applied, the soil is moderately well suited to most cultivated crops. Corn, grain sorghum, and tobacco are the main crops. The soil is friable, is easy to keep in good tilth, and can be worked throughout a wide range of moisture content. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility and tilth. Frequent applications of fertilizer and lime generally are needed.

Wildlife in the urban areas consists mostly of birds and squirrels. The areas of this soil that have been left in native vegetation provide a good source of food, cover, and escape routes for most wildlife.

If this soil is used for urban development, the main limitations are the periodic wetness and droughtiness. Drainage is needed if roads and building foundations are constructed. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of water supplies resulting from seepage. Septic tank absorption fields are mounded in most areas.

Housing development plans should provide for the preservation of as many trees as possible. Selection of suitable vegetation is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. The native trees consist of American holly, laurelcherry, Chickasaw plum, dogwood, fringetree, hickory, southern magnolia, oak, pine, persimmon, redbud, red maple, red cedar, and sweetgum. The native shrubs include American beautyberry, coralbean, pawpaw, strawberry bush, shining sumac, viburnum, and waxmyrtle. The herbaceous plants and vines are aster, beebalm, blazingstar, iris, and sunflower.

This soil is moderately well suited to recreational development. The main limitation is the wetness. The sandy texture of the surface layer makes walking difficult. Good drainage is needed for paths and trails. A plant cover is somewhat difficult to establish and maintain, but it can be maintained by controlling heavy traffic and by irrigating.

The land capability classification is IIIw, and the woodland ordination symbol is 9W.

52—Osier loamy fine sand, frequently flooded. This nearly level, poorly drained soil is on flood plains and in drainageways of the St. Marys River. It is frequently flooded for brief periods in most years. The mapped areas range from about 3 to 75 acres. Slopes are smooth, convex, or concave and are 0 to 2 percent.

In 99 percent of the areas mapped as Osier loamy fine sand, frequently flooded, Osier and similar soils make up 96 to 100 percent of the map unit. Dissimilar soils make up 0 to 4 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is loamy fine sand about 14 inches thick. It is very dark gray in the upper part and dark grayish brown in the lower part. The underlying material, to a depth of about 80 inches, is, in sequence downward, grayish brown fine sand, light brownish gray fine sand, dark grayish brown fine sand, grayish brown loamy fine sand, and white fine sand. Some soils occurring in areas of this map unit are similar to the Osier soil but are covered with 8 to 16 inches of organic material and other soils have stratified layers of loamy fine sand and fine sandy loam.

Included in this map unit are small areas of dissimilar soils. These are Ellabelle soils, which are in positions on the landscape similar to those of the Osier soil.

Permeability of this Osier soil is rapid. The available water capacity is very low or low. The seasonal high water table is within 6 inches of the surface for 3 to 6 months in most years. The soil is low or very low in natural fertility.

This soil is used mainly as woodland. The natural vegetation consists of pond pine, baldcypress, water tupelo, sweetgum, and water oak. The understory includes saw palmetto, gallberry, and waxmyrtle. The most common grasses are little bluestem, panicum, pineland threeawn, toothachegrass, and cutover muhly.

This soil generally is very poorly suited to pine trees. Under natural conditions, however, it is suited to cypress and hardwoods. The main concerns in producing and harvesting timber are seedling mortality and the equipment limitation. The wetness is a limitation affecting the use of equipment. Planting trees on bedded rows will lower the effective depth of the water table. Trees selected for planting should be those that can withstand the wetness, and they should be planted or harvested during dry periods. Hand planting methods can be used when the soil is too wet to support heavy equipment.

This soil is very poorly suited to pasture and to cultivated crops because of the wetness, the flooding, and the low fertility.

This soil provides good habitat for waterfowl, reptiles, amphibians, and mammals. Many birds inhabit the area, including chickadee, titmouse, yellow-billed cuckoo, wood duck, limpkin, acadian flycatcher, owl, hooded warbler, cedar waxwing, woodpecker, and wren. The various native vegetation on this soil provides a good source of food, cover, and escape routes for the wildlife.

This soil is very poorly suited to urban or recreational development because of the wetness and the flooding.

The land capability classification is Vw. This soil has not been assigned a woodland ordination symbol.

53—Meadowbrook fine sand. This nearly level, poorly drained soil is on broad, low flats and in sloughs. The mapped areas range from about 3 to 50 acres. Slopes are smooth or convex and are 0 to 2 percent.

In 90 percent of the areas mapped as Meadowbrook fine sand, Meadowbrook and similar soils make up 80 to 100 percent of the map unit. Dissimilar soils make up 0 to 20 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is black fine sand about 8 inches thick. The subsurface layer, to a depth of about 44 inches, is fine sand. In sequence downward, it is dark gray, gray, and light gray. The subsoil, to a depth of 80 inches or more, is greenish gray sandy clay loam. Goldhead soils, which are similar to the Meadowbrook soil, are in areas of this map unit.

Included in the map unit are small areas of dissimilar soils. These are Albany, Boulogne, Osier, and Sapelo soils. Albany soils are in higher positions on the landscape than the Meadowbrook soil. Boulogne and Sapelo soils are on flatwoods. Osier soils are in positions on the landscape similar to those of the Meadowbrook soil.

Permeability of this Meadowbrook soil is rapid in the surface and subsurface layers and moderately slow in the subsoil. The available water capacity is very low or low in the surface and subsurface layers and moderate in the subsoil. The seasonal high water table is within 12 inches of the surface for 3 to 6 months of the year. The surface layer remains wet for long periods after heavy rainfall. The soil is low in natural fertility.

This soil is used mainly as woodland. In a few areas it is used for pasture or crops.

The natural vegetation consists of slash pine, longleaf pine, sweetgum, blackgum, and water oak. The understory includes a few saw palmetto. The most common grasses are pineland threeawn, pinehill bluestem, little bluestem, panicum, toothachegrass, muhly, and switchgrass.

This soil is moderately suited to slash pine, loblolly pine, and longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine and loblolly pine is 60 feet. The potential production is 28 cords per acre for slash pine and 36 cords per acre for loblolly pine *(7)* based on a 25-year rotation. The average site index for longleaf pine is 70 feet. The estimated potential production is 43 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are seedling mortality and the equipment limitation. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during dry periods help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations. Construction of access roads, logging activities, and site preparation should be avoided in streambeds and adjacent areas because of the hazard of erosion. Tree limbs and tops should be kept clear of the stream channel because they can block streamflow.

Site preparation, such as roller chopping, burning, applications of herbicide, and bedding, can reduce the amount of debris, control immediate plant competition, and facilitate planting. Special site preparation, such as harrowing, bedding, or double bedding, can help to establish seedlings, reduce the seedling mortality rate, and increase the early growth rate. Bedding should be planned so that it does not impair natural surface drainage. Short-term drainage is needed in some of the wetter areas until the pine's uptake of water lowers the water table, at which time the drains should be blocked. Management practices should include selection of appropriate plants and applications of fertilizer during planting operations.

This soil is moderately suited to pasture. Wetness, the low fertility, and droughtiness are the main limitations. When the soil is wet, grazing causes compaction of the surface layer and damage to the plant community. Excess surface water can be removed from most areas by installing and maintaining field drains. Tall fescue, coastal bermudagrass, and bahiagrass are the best suited pasture plants. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is very poorly suited to cultivated crops. The main limitations are the periodic wetness and the low fertility. Corn and grain sorghum are the best suited crops to plant. A drainage system is needed for most cultivated crops and pasture plants. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture help to maintain fertility and tilth. Frequent applications of fertilizer and lime generally are needed.

This soil provides good habitat for deer, bobcats, skunks, opossums, quail, and turkeys. It provides fair habitat for squirrels and for many birds, particularly warblers, and poor habitat for doves. Wildlife in the urban areas consists mostly of birds. The areas of this soil that have been left in native vegetation provide a good source of food, cover, and escape routes for most wildlife.

If this soil is used for urban development, the main limitations are the periodic wetness and droughtiness. Drainage is needed if roads and building foundations are constructed. Structures to divert runoff are needed if buildings and roads are constructed. Housing development plans should provide for the preservation of as many trees as possible. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of water supplies resulting from seepage. Septic tank absorption fields are mounded in most areas. Topsoil can be stockpiled and used to reclaim areas disturbed by cutting and filling.

Drainage is needed for the best results with most lawn grasses, shade trees, ornamental trees, shrubs, vines, and vegetable gardens. Native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of American holly, cabbage palm, common persimmon, live oak, longleaf pine, and slash pine. The native shrubs include American beautyberry, coontie, coralbean, partridge pea, pawpaw, saw palmetto, shining sumac, tarflower, and southern waxmyrtle. The herbaceous plants are blazingstar, Catesby lily, goldleaf goldaster, hibiscus, iris, meadow beauty, sunflower, and zephyr lily.

This soil is poorly suited to recreational development. The main limitations are the wetness and the sandy texture of the surface layer. Good drainage is needed for paths and trails. Vehicles are easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is IVw, and the woodland ordination symbol is 7W.

54—Sapelo fine sand. This nearly level, poorly drained soil is on broad flatwoods. The mapped areas range from about 3 to 80 acres. Slopes are smooth and are 0 to 2 percent.

In 89 percent of the areas mapped as Sapelo fine sand, Sapelo and similar soils make up 83 to 95 percent of the map unit. Dissimilar soils make up 5 to 17 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is black fine sand about 6 inches thick. The subsurface layer, to a depth of about 21 inches, is fine sand. It is gray in the upper part and light gray in the lower part. The upper part of the subsoil, to a depth of about 27 inches, is black fine sand. Separating the upper and lower parts of the subsoil is a buried subsurface layer. This layer, to a depth of about 43 inches, is brown loamy sand. The lower part of the subsoil, to a depth of about 70 inches, is gray fine sandy loam and light brownish gray sandy clay loam. The substratum, to a depth of about 80 inches, is gray loamy fine sand. Soils occurring in areas of this map unit that are similar to the Sapelo soil are Boulogne and Chaires soils.

Included in this map unit are small areas of dissimilar soils. These are Albany, Leon, Goldhead, and Meadowbrook soils. Albany soils are on slightly elevated ridges. Leon soils are on flatwoods. Goldhead and Meadowbrook soils are in sloughs and depressions. Also included are soils that have a dark subsoil just below the surface layer.

Permeability of this Sapelo soil is rapid in the surface, subsurface, and buried subsurface layers; moderate in the upper part of the subsoil; and moderately slow in the lower loamy part. The available water capacity is very low or low in the surface, subsurface, and buried subsurface layers and moderate in the subsoil. The seasonal high water table is within 12 inches of the surface for 1 to 4 months of the year. The soil is very low in natural fertility.

This soil is used mainly as woodland. The natural vegetation consists of slash pine, longleaf pine, and water oak. The understory includes saw palmetto and gallberry. The most common grasses are pineland threeawn, creeping bluestem, chalky bluestem, hairy panicum, and lopsided indiangrass.

This soil is moderately suited to slash pine, loblolly pine, and longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine and loblolly pine is 60 feet. The potential production is 28 cords per acre for slash pine and 36 cords per acre for loblolly pine *(7)* based on a 25-year rotation. The average site index for longleaf pine is 70 feet. The estimated potential production is 43 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are the equipment limitation and seedling mortality. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during dry periods help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations. Construction of access roads, logging activities, and site preparation should be avoided in streambeds and adjacent areas because of the hazard of erosion. Tree limbs and tops should be kept clear of the stream channel because they can block streamflow.

Site preparation, such as roller chopping, burning, applications of herbicide, and bedding, can reduce the amount of debris, control immediate plant competition, and facilitate planting. Special site preparation, such as harrowing and bedding, can help to establish seedlings, reduce the seedling mortality rate, and increase the early growth rate. Bedding should be planned so that it does not impair natural surface drainage. Short-term drainage is needed in some of the wetter areas until the pine's uptake of water lowers the water table, at which time the drains should be blocked. A major management concern is the low available water capacity, which causes severe seedling mortality and retards plant growth. Management practices should include selection of appropriate plants and applications of fertilizer during planting operations. The soil commonly is very low in organic matter content. Harvesting methods that remove all tree biomass from the site further reduce soil fertility. Logging operations should leave residual biomass distributed over the site.

This soil is moderately well suited to pasture. The main limitations are the periodic wetness and droughtiness. All native pasture plants can be grown, but bunch-type species, if planted alone, generally are not suitable because of the hazard of erosion. The wetness is a limitation affecting the plant species that can be grown and the period of grazing. When the soil is wet, grazing causes compaction of the surface layer, poor tilth, and excessive runoff. The low available water capacity is a limitation affecting the growth of plants that are suitable for pasture. Drought-tolerant species, such as bahiagrass, coastal bermudagrass, and legumes, are the best suited pasture plants. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is very poorly suited to cultivated crops. The main limitations are the periodic wetness and droughtiness and the very low fertility. Corn and grain sorghum are the best suited crops to plant. Proper row management, lateral ditches or tile drains, and properly constructed outlets will remove the excess surface water. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or a grass-legume mixture can help to maintain fertility and tilth. Frequent applications of fertilizer and lime generally are needed.

This soil provides very good habitat for deer, quail, bobcats, skunks, opossums, raccoons, and turkeys and for many birds, particularly warblers. It provides fair habitat for squirrels and poor habitat for doves. Wildlife in the urban areas consists mostly of birds and squirrels. The areas of this soil that have been left in native vegetation provide a good source of food, cover, and escape routes for most wildlife.

This soil is poorly suited to urban development. The main limitation is the wetness. Drainage is needed if roads and building foundations are constructed. The wetness can be reduced by installing tile drains around the footings. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of water supplies resulting from seepage. Septic tank absorption fields are mounded in most areas. Unless vegetation is established, erosion and sedimentation commonly are problems in some water management systems.

Housing development plans should provide for the preservation of as many trees as possible. Mulch, fertilizer, and irrigation are needed to establish lawn grasses and other small seeded plants. Drainage is needed for most lawn grasses, shade trees, ornamental trees, shrubs, vines, and vegetable gardens. Native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of American holly, cabbage palm, common persimmon, live oak, longleaf pine, and slash pine. The native shrubs include American beautyberry, coontie, coralbean, partridge pea, pawpaw, saw palmetto, shining sumac, tarflower, and southern waxmyrtle. The herbaceous plants and vines are blazingstar, Catesby lily, grassleaf goldaster, hibiscus, iris, meadow beauty, sunflower, and zephyr lily.

This soil is poorly suited to recreational development. The main limitations are the wetness and the sandy texture of the surface layer. The loose sand makes walking difficult. Good drainage is needed for paths and trails. Vehicles are easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is IVw, and the woodland ordination symbol is 7W.

55—Meadowbrook-Goldhead-Meggett complex, 2 to 5 percent slopes. These gently sloping, poorly drained soils are on side slopes near the St. Marys River. The mapped areas range from about 3 to 75 acres. Slopes are 2 to 5 percent.

In 97 percent of the areas mapped as Meadowbrook-Goldhead-Meggett complex, 2 to 5 percent slopes, Meadowbrook, Goldhead, Meggett, and similar soils make up 94 to 100 percent of the map unit. Dissimilar soils make up 0 to 6 percent. They are generally in areas less than 3 acres in size.

Generally, the mapped areas are about 41 percent Meadowbrook and similar soils, 31 percent Goldhead and similar soils, 22 percent Meggett soils, and 6 percent dissimilar soils. The soils in this map unit are so intermingled that it is not practical to map them separately at the scale used. The proportions and patterns of the Meadowbrook, Goldhead, Meggett, and similar soils, however, are relatively consistent in most areas.

Typically, the surface layer of the Meadowbrook soil is black fine sand about 8 inches thick. The subsurface layer, to a depth of about 65 inches, is grayish brown and dark grayish brown fine sand. The subsoil, to a depth of about 80 inches, is light gray fine sandy loam. Some soils occurring in areas of this map unit are similar to the Meadowbrook soil but have slopes of more than 5 percent.

Typically, the surface layer of the Goldhead soil is very dark brown fine sand about 2 inches thick. The subsurface layer, to a depth of about 32 inches, is fine sand. It is gray in the upper part, dark gray in the next part, and light gray in the lower part. The subsoil, to a depth of about 80 inches, is gray fine sandy loam in the upper part and gray sandy clay loam in the lower part. Some soils occurring in areas of this map unit are similar to the Goldhead soil but have slopes of more than 5 percent.

Typically, the surface layer of the Meggett soil is very dark brown fine sandy loam about 8 inches thick. The subsoil extends to a depth of about 80 inches. It is dark gray sandy clay in the upper part, light brownish gray sandy clay and light brownish gray sandy clay loam in the next part, and gray clay loam in the lower part.

Included in this map unit are small areas of dissimilar soils. These are Albany, Boulogne, Chaires, and Sapelo soils. They are in the more elevated positions on the landscape.

Permeability of the Goldhead and Meadowbrook soils is rapid in the upper part of the soil and moderately slow in the lower part. The permeability of the Meggett soil is moderately rapid in the surface and subsurface layers and slow in the upper part of the subsoil. The available water capacity of all three soils is low or moderate in the surface and subsurface layers and moderate or high in the subsoil. The seasonal high water table is within 6 inches of the surface for 3 to 6 months of the year. The Goldhead and Meadowbrook soils are low in natural fertility.

These soils are used mainly as woodland. The natural vegetation consists of slash pine, longleaf pine, sweetgum, blackgum, water oak, and bay. The understory includes saw palmetto, gallberry, waxmyrtle, and greenbrier. The most common grasses are pineland threeawn, pinehill bluestem, little bluestem, panicum, toothachegrass, and switchgrass.

These soils generally are very poorly suited to pine trees. Under natural conditions, however, they are suited to cypress and hardwoods. The major management concern is the high water table, which causes seedling mortality. The water table and high organic matter content in the surface layer prevent the use of heavy equipment. Adequate drainage outlets are not available; therefore, drainage is not practical.

These soils are moderately suited to pasture. Seedbed preparation should be on the contour or across the slope, if it is practical. The wetness is a limitation affecting the plant species that can be grown and the period of grazing. When the soil is wet, grazing causes surface compaction, poor tilth, and excessive runoff. A cover of pasture grasses helps to control erosion. The best suited pasture plants are tall fescue, coastal bermudagrass, and bahiagrass. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

These soils are very poorly suited to cultivated crops.

These soils provide very good habitat for deer, bobcats, skunks, opossums, raccoons, quail, and turkeys. They provide fair habitat for squirrels and poor habitat for doves.

These soils are very poorly suited to urban development. The main limitations are the wetness, the slope, and the sandy texture of the surface layer.

These soils are poorly suited to recreational development. The main limitations are the wetness, the slope, and the sandy texture of surface layer. Because of the slope, recreation areas are limited to a few paths and trails, which should extend across the slope. Good drainage is needed for paths and trails. Cuts and fills should be seeded or mulched. Erosion and sedimentation can be controlled and the beauty of the area can be enhanced where adequate plant cover is maintained by control of heavy traffic and by irrigation.

The land capability classification is IVw. These soils have not been assigned a woodland ordination symbol.

56—Blanton-Ortega fine sands, 5 to 12 percent slopes. These sloping and strongly sloping, somewhat poorly drained and moderately well drained soils are on side slopes near the St. Marys River. The mapped areas range from about 3 to 65 acres. Slopes are 5 to 12 percent.

In 87 percent of the areas mapped as Blanton-Ortega fine sands, 5 to 12 percent slopes, Blanton, Ortega, and similar soils make up 75 to 100 percent of the map unit. Dissimilar soils make up 0 to 25 percent. They generally are in areas less than 3 acres in size.

Generally, the mapped areas are about 73 percent Blanton and similar soils, 20 percent Ortega and similar soils, and 7 percent dissimilar soils. The soils in this map unit are so intermingled that it is not practical to map them separately at the scale used. The proportions and patterns of the Blanton, Ortega, and similar soils, however, are relatively consistent in most areas.

Typically, the surface layer of the Blanton soil is dark grayish brown fine sand about 3 inches thick. The subsurface layer, to a depth of about 58 inches, is very pale brown fine sand. The subsoil, to a depth of 80 inches or more, is light yellowish brown fine sandy loam. Soils occurring in areas of this map unit that are similar to the Blanton soil are Albany, Ocilla, and Kershaw soils and some soils that have a slope of more than 12 percent, have a yellowish brown subsoil at a depth of 20 to 40 inches, or are well drained and have a loamy subsoil at a depth of more than 40 inches.

The Ortega soil is moderately well drained. Typically, the surface layer is dark grayish brown fine sand about 3 inches thick. The underlying material, to a depth of about 80 inches, is fine sand. It is yellowish brown in the upper part, yellow in the next part, and very pale brown in the lower part. Ridgewood soils, which are similar to the Ortega soil, are in small areas of this map unit.

Included in this map unit are small areas of dissimilar soils. These soils have a loamy subsoil within 20 inches of the surface.

Permeability of the Blanton soil is rapid in the upper part of the soil and moderate in the lower part. The available water capacity is very low or low in the surface and subsurface layers and moderate in the subsoil. In most years the seasonal high water table is at a depth of 30 to 48 inches for 1 to 3 months of the year and at a depth of 48 to 60 inches for 4 to 8 months or more. The soil is low in natural fertility.

Permeability of the Ortega soil is rapid. The available water capacity is low or very low. In most years the seasonal high water table is at a depth of 42 to 60 inches for 6 to 8 months or more. It recedes to a depth of more than 60 inches during prolonged dry periods. The soil is low in natural fertility.

These soils are used mainly as woodland. The natural vegetation consists of turkey oak, water oak, slash pine, and longleaf pine. The understory includes gallberry. The most common grasses are pineland threeawn, little bluestem, pinehill bluestem, slender bluestem, panicum, toothachegrass, and switchgrass.

These soils are moderately suited to slash pine, loblolly pine, and longleaf pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating is 55 feet for slash pine and for loblolly pine. The potential production is 23 cords per acre for slash pine and 31 cords per acre for loblolly pine *(7)* based on a 25-year rotation. The average site index for longleaf pine is 65 feet. The estimated potential production is 36 cords per acre for longleaf pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are seedling mortality, the equipment limitation, plant competition, and the hazard of erosion. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during dry periods help to overcome the equipment limitation, minimize soil compaction, and minimize root damage during thinning operations. Construction of access roads, logging activities, and site preparation should be avoided in streambeds and adjacent areas because of the hazard of erosion. Tree limbs and tops should be kept clear of the stream channel because they can block streamflow. To reduce the hazard of erosion, fire lines and access roads should slope gently to the streams and cross the streams at a right angle. Stream crossing should be avoided if possible. Culverts and bridges may be needed. Access roads and water bars on skid trails and fire lines need water turnouts, or broad-based dips, to direct water and sediment away from the roads, water bars, and streams and into the surrounding woods. When the roads are no longer in use, they should be closed and seeded to prevent erosion. Measures that reduce the hazard of erosion are needed when timber is harvested.

Special site preparation, such as harrowing, bedding, or double bedding, can help to establish seedlings, reduce the seedling mortality rate, and increase the early growth rate. Conventional harvesting methods can be used in the more gently sloping areas, but they are difficult to use in the steeper areas. Mechanically planting trees on the contour helps to control erosion. A major management concern is the very low available water capacity, which causes severe seedling mortality and retards plant growth. Management practices should include selection of appropriate plants and applications of fertilizer during planting operations.

These soils are poorly suited to pasture and to cultivated crops because of droughtiness, the low fertility, and the slope.

These soils provide very good habitat for deer, turkey, and squirrel and for many songbirds. They also provide good habitat for raccoons, opossums, bobwhite quail, and doves; fair habitat for reptiles; and poor habitat for most amphibians. Hardwood mast, such as acorns, nuts, fruits, buds, and berries, is a good source of food for wildlife. The mature hardwoods and snags provide good nesting sites for birds.

These soils are poorly suited to urban and recreational development because of the slope. The slope affects the use of these soils for paths and trails, which should extend across the slope. Good drainage for paths and trails is necessary. Areas that have been cut and filled should be seeded or mulched. Erosion and sedimentation can be controlled and the beauty of the area can be enhanced by maintaining an adequate plant cover.

The land capability classification is IVs. The woodland ordination symbol is 11S for the Blanton soil and 10S for the Ortega soil.

57—Penney fine sand, 0 to 5 percent slopes. This nearly level and gently sloping, excessively drained soil is on broad ridges and on isolated knolls. The mapped areas range from about 3 to 120 acres. Slopes are smooth or convex.

In 94 percent of the areas mapped as Penney fine sand, 0 to 5 percent slopes, Penney and similar soils make up 87 to 100 percent of the map unit. Dissimilar soils make up 0 to 13 percent. They generally are in areas less than 3 acres in size.

Typically, the surface layer is dark gray fine sand about 5 inches thick. The subsurface layer extends to a depth of about 80 inches. The upper part is light yellowish brown and very pale brown fine sand. The lower part, which has been mixed with the subsoil, is very pale brown fine sand that has thin lamellae of strong brown loamy fine sand. Kershaw soils, which are similar to the Penney soil, are in some areas of this map unit.

Included in this map unit are small areas of dissimilar soils. These soils are well drained and have a loamy subsoil at a depth of more than 40 inches.

Permeability of this Penney soil is rapid. The available water capacity is very low and low. The seasonal high water table is below a depth of 72 inches. The soil is low in natural fertility.

This soil is used mainly as woodland and for urban development.

The natural vegetation consists of longleaf pine, live oak, and turkey oak. The most common grasses are chalky bluestem, lopsided indiangrass, hairy panicum, creeping bluestem, slender bluestem, and pineland threeawn.

This soil is poorly suited to slash pine and is moderately suited to longleaf pine and sand pine. Growth estimates are given in feet for the expected height a tree will reach in a specific number of years. Site quality curves, which are based on a growth estimate for 25 years, are often used for short-rotation products, such as cordwood and pulp. Site index curves generally are based on a growth estimate for 50 years or more and are used for slower growing species or products requiring a longer rotation. The average site quality rating for slash pine is 50 feet. The potential production is 18 cords per acre for slash pine *(7)* based on a 25-year rotation. The average site index is 70 feet for longleaf pine and 80 feet for sand pine. The estimated potential production is 43 cords per acre for longleaf pine and 38 cords per acre for sand pine based on a 50-year rotation.

The main concerns in producing and harvesting timber are seedling mortality and the equipment limitation. Using tracks or floatation tires on planting and harvesting machinery and scheduling harvesting and planting operations during dry periods help to overcome the equipment limitation. Hardwood understory can be reduced by controlled burning, applying herbicide, or girdling or cutting of the unwanted trees. A major management concern is the low and very low available water capacity, which causes severe seedling mortality and reduces growth. Planting special nursery stock that is larger than usual or that is containerized can reduce the seedling mortality rate. Natural regeneration may be preferable in the drier areas. Management practices should include selecting appropriate plants and leaving debris on the site. The soil commonly is very low in organic matter content. Harvesting methods that remove all tree biomass from the site further reduce soil fertility. Logging operations should leave residual logging biomass distributed over the site.

This soil is poorly suited to pasture and to cultivated crops because of droughtiness and the low fertility.

This soil provides habitat for deer and turkey, especially for use as escape cover. Many birds, including warblers, towhees, crested flycatchers, doves, and quail, inhabit the area. Several varieties of native legumes furnish food for the birds. The harvesting of timber and similar disturbances improve wildlife food values by increasing the amount, availability, and types of herbaceous plants and by producing new sprouts. Wildlife in the urban areas consists mostly of birds. The areas of this soil that have been left in native vegetation provide a good source of food, cover, and escape routes for most wildlife.

This soil is moderately suited to urban development. The main limitation is the droughtiness. If the density of housing is moderate or high, a community sewage system is needed to prevent contamination of water supplies resulting from seepage. Vegetation is difficult to establish because the soil is infertile, coarse textured, and droughty. Water moves rapidly through the soil. Intensive management practices, including irrigation during dry periods, are needed to establish and maintain vegetation on this soil. Maintenance is difficult without adequate applications of fertilizer. Unless vegetation is established, wind erosion can be a problem during and after construction.

Native plants should be used for beautification and landscaping because they are more easily established and require less maintenance than other plants. The native trees consist of American holly, Chickasaw plum, longleaf pine, slash pine, live oak, southern redcedar, sand pine, turkey oak, and bluejack oak. The native shrubs include adam's needle, American beautyberry, Carolina holly, coontie, coralbean, Florida chinkapin, pawpaw, pricklypear cactus, saw palmetto, shining sumac, and yaupon.

This soil is poorly suited to recreational development. The main limitation is the sandy texture of the surface layer. The loose sand makes walking difficult. A plant cover is difficult to establish and maintain, but it can be maintained by controlling heavy traffic and by irrigating. Vehicles are easily mired down, and soil blowing can occur if the surface is bare.

The land capability classification is IVs, and the woodland ordination symbol is 8S.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

This section was prepared by Allen L. Moore, district conservationist, William F. Kuenstler, agronomist, and E. Norman Porter, area agronomist, Soil Conservation Service.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

More than 10,000 acres in Nassau County is used for crops and pasture. About 9,100 acres is used as permanent pasture and more than 1,600 acres for crops, such as corn and grain sorghum. The acreage in crops and pasture has gradually been decreasing as more and more land is used for urban development.

Soil erosion is not a major problem on the cropland and pastureland in the county. Information on the design of erosion control practices for each kind of soil is available from the local office of the Soil Conservation Service.

Soil blowing can be a hazard on the better drained sandy soils and on the more poorly drained sandy soils that have been drained. It can damage crops in a few hours if the wind is strong and the soil is dry and bare of vegetation or surface mulch. Soil blowing can be reduced by maintaining a vegetative cover or surface mulch; by planting windbreaks of adapted plant species, such as pine, red cedar, and myrtle; and by planting properly spaced temporary strips of seasonal small grain at a right angle to the damaging wind.

Soil drainage is a major concern in management on most of the acreage used for crops and pasture in the county. Some soils are wet and need artificial drainage or water control for the production of specialty crops and pasture grasses. These soils include the poorly drained Meggett, Boulogne, Leon, Chaires, Meadowbrook, Pottsburg, Goldhead, and Sapelo soils and the very poorly drained Kingsferry soils. Albany, Blanton, Centenary, Hurricane, Leefield, Ocilla, Ortega, and Ridgewood soils have good natural drainage and tend to dry out quickly after rains. Irrigation is needed for crop production during periods of low rainfall.

The design of both surface and subsurface drainage systems varies with the kind of soils. Surface drainage is needed in most areas of poorly drained and very poorly drained soils that are used for specialty crops and pasture. If surface ditches are used, the poorly drained soils on flatwoods are well suited to improved pasture grasses. Unless some of the poorly drained soils are artificially drained, excessive wetness will cause some damage to pasture grasses during wet seasons.

Soil fertility is naturally low in most soils in the county. Most of the soils are naturally acid. Meggett soils range from slightly acid to mildly alkaline and are higher in plant nutrients than most of the other soils in the county.

The addition of lime and fertilizer should be based on the results of soil tests, on the needs of the crop, and on the expected level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

Field crops grown in the county include corn, grain sorghum, and some tobacco. The corn and grain sorghum are used as feed for dairy cattle.

The latest information and suggestions for growing specialty crops can be obtained from the local offices of the Soil Conservation Service and the Cooperative Extension Service.

The main pasture plants in the county are improved bermudagrass and bahiagrass. Excess grass is harvested as hay and is either sold or is used as winter feed. Millet, sorghum, and Sudan grass hybrids are grown during the summer for green chop or are used for grazing. The latest information and suggestions for growing and managing pasture can be obtained from the local offices of the Soil Conservation Service and the Cooperative Extension Service.

Farm income in the county is derived mostly from livestock enterprises, mainly dairy farms. On most dairies the forage produced is supplemented by corn or grain sorghum silage.

In areas of similar climate and topography, differences in the kinds and amounts of forage that the pasture can produce are related closely to the kind of soil. Pasture management is based on the relationship among soils, pasture plants, lime and fertilizer, and grazing systems. Yields can be increased by adding lime and fertilizer and by including grass-legume mixtures in the cropping system.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 4. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 4 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Woodland Management and Productivity

This section was prepared by Scott Zobel, forester, Nassau County; Robert C. Williams, forest area supervisor, Florida Division of Forestry; and Marshall A. Jacobson, senior research forester, ITT Rayonier, Incorporated.

About 338,600 acres, or nearly 82 percent of Nassau County, is in woodland. Forestry has played an important economic role in the county's growth. After the early settlement of the county, longleaf pine dominated the better drained sites and slash pine the wet flatwoods. Longleaf pine was the only tree that could withstand the fires set by the settlers to clear woodland for grazing. Baldcypress, pondcypress, black tupelo, sweetgum, red maple, and various bays were the main trees on the river flood plain and along ponds, drainageways, and swamps.

Harvesting timber, collecting pine gum resin, and cutting railroad crossties once provided many jobs to area residents. Past, and some current, timber cutting practices by private landowners, however, have failed to provide for adequate regeneration of commercially important species. Also, exclusion of fire from the woods has allowed undesirable hardwoods to dominate and has further inhibited the establishment and growth of pine trees.

The soils and climate of the county are excellent for the management of southern pines. Slash pine is the dominant commercial tree and is planted throughout the county. Loblolly pine is widely planted on Meggett and Goldhead soils in the central part of the county. Natural stands of longleaf pine are scattered throughout the area on Blanton, Centenary, Hurricane, Kershaw, Ortega, Penney, and Ridgewood soils. Soil fertility gradually increases from the coastal areas inland to U.S. Highway 1. Applications of nitrogen, phosphorus, and potassium during planting operations encourage excellent growth response. Loblolly pine and slash pine grow best if adequate phosphorus is applied. Additional applications of fertilizer at midrotation should be based on a soil test or tissue analysis. Timber management consists mainly of clearcutting and intensive site preparation. The thinning of pine stands for residual sawtimber growth and salvage purposes is practiced on a small scale in the area. Prescribed burning is very important for slash removal during site preparation, for reducing the wildfire hazard in established stands, and for encouraging the growth of grasses and forbs that provide food or cover for cattle and a diversity of wildlife.

On the poorly drained soils in most of Nassau

County, management practices are those that help to overcome the seasonal wetness and plant competition. The equipment limitation is severely restricted during wet periods. Plant competition from heavy brush and hardwood sprouting can severely affect seedling survival and growth. Site preparation, such as chopping and bedding or double bedding, helps establish seedlings, reduces seedling mortality, and increases early growth of the seedlings. Bedding should not block natural drainage.

A high demand for timber is expected to continue well into the next century. This solid market has helped many landowners continue growing and managing their woodland for maximum production. To make the most of an investment in timber, decisions about which trees to plant should be based on an evaluation of soil productivity as well as quality of products produced at final harvest. Physical soil characteristics indicate productivity. The most important characteristic that affects production capacity is the ability of the soil to provide adequate moisture. Other factors include the thickness of the surface layer and its content of organic matter, the natural supply of nutrients, texture and consistency of the soil material, aeration, internal drainage capabilities, and the depth to the water table. A well managed stand of trees prevents soil deterioration and conserves soil and water resources. One important function of trees is to protect the soil. Erosion is not an important factor in most of the county; however, the ability of tree cover to allow more moisture to enter the soil by reducing rainfall impact with the soil is important to ground-water supplies.

Markets are plentiful for local wood producers. Six pulpmills are within a 60-mile radius of Nassau County. Chip-n-saw logs, poletimber, and veneer timber are aggressively marketed. Timber buyers and loggers are abundant with more than 20 companies serving the area. The market for cypress sawtimber is growing. Most cypress is sold locally for fencing and rough lumber, and residual material is sold for mulch.

Management of woodland wildlife habitat is an important recreational and economic concern in the area. In 1987, the Florida Game and Fresh Water Fish Commission had more than 40,168 acres of timberland open to the public in the Nassau Wildlife Management Area; however, most of the land was leased to individual hunting clubs. Current forestry practices, such as clearcutting and burning, favor wildlife food and cover. Deer, turkey, feral hogs, and quail are the main game animals.

Cary State Forest is along the Nassau-Duval county line in the southwestern part of the county. This 3,400-acre area is managed under a multiple-use concept. Educational activities, timber production, recreation, and wildlife habitat are the main considerations. An environmental education pavilion, primitive campsite, fire tower, and ranger residence are located in the forest. Environmental education classes for local students in Nassau and Duval Counties are conducted year round. Timber management practices include thinning, prescribed burning, natural pine reproduction, and some tree planting. Diversity is a key element to management.

Individuals own thousands of acres of poorly stocked woodland throughout the county. Information is available about individual soils and about site selection that can help landowners make decisions that are necessary to increase productivity and yields on their land. More detailed information on woodland management can be obtained at the local office of the Soil Conservation Service, the Florida Division of Forestry, or the Cooperative Extension Service.

Soils vary in their ability to produce trees. Depth, fertility, texture, and the available water capacity influence tree growth. Elevation, aspect, and climate determine the kinds of trees that can grow on a site. The available water capacity and depth of the root zone are major influences of tree growth.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to fertilization than others, and some are more susceptible to erosion after roads are built and timber is harvested. Some soils require special efforts to reforest. In the section "Detailed Soil Map Units," each map unit in the survey area suitable for producing timber presents information about productivity, limitations for harvesting timber, and management concerns for producing timber. The common forest understory plants are also listed. Table 5 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate*, and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

The first tree listed for each soil under the column "Common trees" is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

Table 5 lists the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cords per acre. The larger the number, the greater the potential productivity. Potential productivity is based on the site quality and site index.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation for use and management. The letter *W* indicates a soil in which excessive water, either seasonal or year round, causes a significant limitation. The letter *S* indicates a dry, sandy soil. If a soil has more than one limitation, the priority is W and then S.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation activities or harvesting operations expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of *moderate* or *severe* indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning of harvesting and reforestation operations, or use of specialized equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year round or seasonal, because of such soil characteristics as slope, wetness, or susceptibility of the surface layer to compaction. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On the steeper slopes, tracked equipment must be used. The rating is *slight* if equipment use is restricted by soil wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are steep enough that wheeled equipment cannot be operated safely across the slope, if soil wetness restricts equipment use from 2 to 6 months per year, or if special equipment is needed to avoid or reduce soil compaction. The rating is *severe* if soil wetness restricts equipment use for more than 6 months per year or if special equipment is needed to avoid or reduce soil compaction. Ratings of *moderate* or *severe* indicate a need to choose the most suitable equipment and to carefully plan the timing of harvesting and other management operations.

Ratings of *seedling mortality* refer to the probability of death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall as influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth and duration of the water table, rooting depth, and the aspect of the slope. Mortality generally is greatest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of *moderate* or *severe* indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, or installing surface drainage. Reinforcement planting is often needed if the risk is *moderate* or *severe*. Reinforcement planting is interplanting in the fall with containerized seedlings if stocking is inadequate.

Ratings of *windthrow hazard* indicate the likelihood of trees being uprooted by the wind. Restricted rooting depth is the main reason for windthrow. Rooting depth can be restricted by a high water table or by a combination of such factors as soil wetness, texture, structure, and depth. The risk is *slight* if strong winds cause trees to break but do not uproot them; *moderate* if strong winds cause an occasional tree to be blown over and many trees to break; and *severe* if moderate or strong winds commonly blow trees over. Ratings of *moderate* or *severe* indicate the need for care in thinning or possibly not thinning. Specialized equipment may be needed to avoid damage to shallow root systems in partial cutting operations. A plan for periodic salvage of windthrown trees and the maintenance of a road and trail system may be needed. Annosus root rot fungus, which can infest thinned pine plantations on better drained soils, can cause a windthrow problem.

Ratings of *plant competition* indicate the likelihood of the growth or invasion of undesirable plants. Plant competition becomes more severe on the more productive soils, on poorly drained soils, on dry sandy soils, and on soils having a restricted root zone that holds moisture. The risk is *slight* if competition from undesirable plants inhibits adequate natural or artificial reforestation but does not necessitate intensive site preparation and maintenance. The risk is *moderate* if competition from undesirable plants inhibits natural or artificial reforestation to the extent that intensive site preparation and maintenance are needed. The risk is *severe* if competition from undesirable plants prevents adequate natural or artificial reforestation unless the site is intensively prepared and maintained. A *moderate* or *severe* rating indicates the need for site preparation to ensure the development of an adequately stocked stand. Managers must plan site preparation measures to ensure reforestation without delays.

The *potential productivity* of common trees on a soil is expressed as site quality, site index, and cords per acre. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate. For the soils that are commonly used to produce timber, the yield is predicted in cords per acre *(3, 7, 16)*. Site quality applies to fully stocked, even-aged, managed pine plantations. If a plantation is more than 10 years old, site quality curves of slash pine and loblolly pine can be used to estimate plantation site quality on a 25-year basis. Site index curves of base age 50 are available for sand pine and second-growth natural longleaf pine stands. Since longleaf pine is most often managed for sawtimber products, all values for longleaf pine are based on site index.

Cords per acre is the volume of wood produced by the most important trees. Production figures are based on a stocking of 400 even-aged trees per acre and a 4-inch top outside bark measurement. If a plantation of longleaf pine at age 25 had a site quality of 70, the yield would be 3,870 cubic feet per acre. If 1 rough cord is equal to about 92.5 cubic feet, then the yield would be 42 cords per acre. By applying intensive forest management practices, wood fiber production may be significantly increased over what natural stands will produce.

Woodland Grazing

Clifford Carter, range conservationist, Soil Conservation Service, helped to prepare this section.

Because Nassau County has a large acreage in woodland production, the county has a high potential for woodland grazing. Many of the small, privately owned woodland tracts are fenced and provide some livestock grazing. Most of the larger woodland tracts, which are owned by the timber companies, however, are not fenced, and the forage produced is not harvested.

Because forage production and availability are directly related to tree canopy, the different age classes of trees cause a wide variation in forage production in a given tract. In some places fencing of large areas provides adequate forage for a small number of cattle.

Grazeable woodland is forest that has an understory of native grasses, legumes, and forbs. The understory is an integral part of the woodland plant community. The native plants can be grazed without significantly impairing other woodland values. On such woodland, grazing is compatible with timber management if grazing is controlled or managed so that timber and forage resources are maintained or enhanced.

Understory vegetation is grazed by livestock and by wildlife. Some woodland, if well managed, can produce enough understory vegetation to support grazing by optimum numbers of livestock or wildlife, or both, without damage to the trees. Prescribed burning and commercial thinning are examples of management practices.

Forage production on grazeable woodland varies according to the different kinds of grazeable woodland; the amount of shade cast by the canopy; the accumulation of fallen needles; the influence of time and intensity of grazing on the grasses and forage; and the number, size, spacing, and method of site preparation for tree plantings.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from a commercial nursery.

Recreation

Many recreational facilities are available in Nassau County. The most important tourist attractions are Fort Clinch State Park and the many miles of Atlantic Ocean beaches.

Fishing, hunting, boating, and camping are popular recreational activities. The Atlantic Ocean, the Intracoastal Waterway, and the St. Marys and Nassau Rivers and their major tributaries provide excellent fishing and boating. Large acreages of woodland are used by private hunting clubs. The Nassau Wildlife Management Area, which is controlled by the Florida Game and Fresh Water Fish Commission, provides public hunting on a permit basis. Recreational activities are available at Fort Clinch State Park. Camping, picnicking, swimming, fishing, and nature study areas in rustic settings are provided for local residents and tourists. Several large golf courses on Amelia Island and near Callahan are available to the general public. Other recreation facilities available in the county are swimming pools, tennis courts, football and baseball stadiums, and neighborhood playgrounds.

In table 6, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 6, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 6 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 9 and interpretations for dwellings without basements and for local roads and streets in table 8.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface absorbs rainfall readily but remains firm and is not dusty when dry. Strong slopes can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is firm after rains and is not dusty when dry.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

John F. Vance, Jr., biologist, Soil Conservation Service, helped to prepare this section.

Nassau County, which is mainly rural, provides good habitat for wildlife. The main habitats are the shore along the Atlantic Ocean, the large swamps along the St. Marys and Nassau Rivers and their larger tributaries, and the large tracts of pine flatwoods. More than 220,000 acres is in large forest-industry tracts, including the 40,168-acre Nassau Wildlife Management Area.

Game species include white-tailed deer, squirrels, turkey, bobwhite quail, feral hogs, and waterfowl. Nongame species include raccoon, rabbit, armadillo, opossum, skunk, bobcat, gray fox, red fox, otter, and a variety of songbirds, wading birds, woodpeckers, predatory birds, reptiles, and amphibians.

The freshwater streams and the salt-water areas along the coast provide good fishing opportunities. The main species in the freshwater streams include largemouth bass, channel catfish, bullhead catfish, bluegill, redear sunfish, spotted sunfish, warmouth, black crappie, chain pickerel, gar, bowfin, and sucker. A wide variety of species, including spotted sea trout, flounder, mullet, red drum, and blue crabs, are in the salt-water areas.

A number of endangered and threatened species are in the county. These include the seldom seen redcockaded woodpecker and the more commonly seen alligator. A detailed list of these species with information on range and habitat needs is available at the local office of the Soil Conservation Service.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 7, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, soybeans, browntop millet, dove praso millet, and grain sorghum.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are bahiagrass, florida beggarweed, lovegrass, clover, sesbania, hairy indigo, and aeschynomene.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, partridge pea, and bristlegrass.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, waxmyrtle, palmetto, cherry, sweetgum, wild grape, hawthorn, dogwood, persimmon, hickory, blackberry, gallberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are firethorn, wild plum, and blackberry.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, cypress, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, and slope. Examples of wetland plants are smartweed, wild millet, wild rice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are wetness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, dove, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, opossum, woodcock, armadillo, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bobcat.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, egrets, herons, shore birds, otter, mink, and sandhill crane.

Coastal Dune Management

John D. Griffin, agronomist, Soil Conservation Service, helped to prepare this section.

The coastal dune is a very recent formation in geologic time. It is controlled by the ocean waves and winds. The resulting soil moisture, soil salinity, and salt spray create a harsh environment for most plants.

Dune stabilization depends on the anchoring of vegetation. If the use of shallow wells lowers ground water below a critical level, the stabilizing plants will die. The vegetation is very fragile and vulnerable to trampling. Small jetties extending from the shore arrest the littoral drift and prevent the sand from supplementing the dunes.

The beach can be used for swimming, picnicking, shell collecting, fishing, and sunbathing, but the primary dune cannot withstand heavy traffic. Bridges should be used to cross the primary dune. The trough is less likely to be damaged by traffic, and incidental development can occur. The lowering of the ground water, however, can cause vegetation to die.

The inland dune is the second line of defense and is as vulnerable as the primary dune. It is not suitable for development. The back dune provides the most suitable environment on the coastal dune for people and development.

The estuarine and bay shore environments are among the most productive aquatic areas in the world. Valuable shellfish and fingerlings of important fish species inhabit these areas.

Some of the more important plants on the coastal dune are seaoats, marshhay cordgrass, beach morningglory, bay bean, shoredune panicum, seagrape, and myrtle.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations must be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreational uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 8 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the soil texture and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, depth to a high water table, the available water capacity in the upper 40 inches, and the content of salts and sulfidic materials affect plant growth. Flooding, wetness, slope, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 9 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 9 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, and flooding affect absorption of the effluent.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 9 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, flooding, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope can cause construction problems.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 9 are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, slope, and flooding affect both types of landfill. Texture, highly organic layers, soil reaction, and content of salts affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 10 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. These soils may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 10, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 11 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect each soil for drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of organic matter or salts. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to layers that affect the rate of water movement, permeability, depth to a high water table or depth of standing water if the soil is subject to ponding, slope, susceptibility to flooding, and subsidence of organic layers. Excavating and grading and the stability of ditchbanks are affected by slope and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The performance of a system is affected by the depth of the root zone, the amount of salts, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope and wetness affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Wetness and slope affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 18.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 12 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 13 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay mineral in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is expressed in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

8. Soils that are not subject to soil blowing because of coarse fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 13, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Water Features

Table 14 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

In table 14, some soils are assigned to two hydrologic soil groups. Soils that have a seasonal high water table but can be drained are assigned first to a hydrologic group that denotes the drained condition of the soil and then to a hydrologic group that denotes the undrained condition, for example, B/D. Because there are different degrees of drainage and water table control, onsite investigation is needed to determine the hydrologic group of the soil in a particular location.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 14 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions. There is a near 0 to 5 percent chance of flooding in any year. *Occasional* means that flooding occurs infrequently under normal weather conditions. There is a 5 to 50 percent chance of flooding in any year. *Frequent* means that flooding occurs often under normal weather conditions. There is more than a 50 percent chance of flooding in any year. Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely, thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons, which are characteristic of soils that are not subject to flooding.

Also considered is local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 14 are the depth to the seasonal high water table; the kind of water table—that is, *perched* or *apparent;* and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 14.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

The two numbers in the "High water table—Depth" column indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Physical, Chemical, and Mineralogical Analyses of Selected Soils

Dr. Victor W. Carlisle, professor, Soil Science Department, University of Florida, helped to prepare this section.

Parameters for physical, chemical, and mineralogical properties of representative pedons sampled in Nassau County are presented in tables 15, 16, and 17. The analyses were conducted and coordinated by the Soil Characterization Laboratory at the University of Florida. Detailed profile descriptions of the analyzed soils are given in alphabetical order in the section "Classification of the Soils." Laboratory data and profile information for additional soils in the county, as well as for other counties in Florida, are on file at the University of Florida, Soil Science Department.

Typifying pedons were sampled from pits at carefully selected locations. Samples were air dried, crushed, and sieved through a 2-millimeter screen. Most analytical methods used are outlined in Soil Survey Investigations Report No. 1 *(15)*.

Particle-size distribution was determined using a modified pipette method with sodium hexametaphosphate dispersion. Hydraulic conductivity and bulk density were determined on undisturbed soil cores. Water retention parameters were obtained from duplicate undisturbed soil cores placed in tempe pressure cells. Weight percentages of water retained at 100 centimeters water (1/10 bar) and 345 centimeters water (1/3 bar) were calculated from volumeteric water percentages divided by bulk density. Samples were oven dried and ground to pass a 2-millimeter sieve, and the 15-bar water retention was determined. Organic carbon was determined by a modification of the Walkley-Black wet combustion method.

Extractable bases were obtained by leaching soils with normal ammonium acetate buffered at pH 7.0. Sodium and potassium in the extract were determined by flame emission. Calcium and magnesium were determined by atomic absorption spectrophotometry. Extractable acidity was determined by the barium chloride-triethanolamine method at pH 8.2. The sum of cations, which may be considered a measure of cation-exchange capacity, was calculated by adding the values for extractable bases and extractable acidity. Base saturation is the ratio of extractable bases to cation-exchange capacity expressed in percent. The pH measurements were made with a glass electrode using a soil-water ratio of 1:1; a 0.01 molar calcium chloride solution in a 1:2 soil-solution ratio; and normal potassium chloride solution in a 1:1 soil-solution ratio.

Electrical conductivity determinations were made with a conductivity bridge on 1:1 soil to water mixtures. Iron and aluminum extractable in sodium dithionite-citrate were determined by atomic absorption spectrophotometry. Aluminum, carbon, and iron were extracted from probable spodic horizons with 0.1 molar sodium pyrophosphate. Determination of aluminum and iron was by atomic absorption, and determination of extracted carbon was by the Walkley-Black wet combustion method.

Mineralogy of the clay fraction less than 2 microns was ascertained by x-ray diffraction. Peak heights at 18-, 14-, 7.2-, and 4.31-angstrom positions represent montmorillonite, interstratified expandable vermiculite or 14-angstrom intergrades, kaolinite, and quartz, respectively. Peaks were measured, summed, and normalized to give the percent of soil minerals identified in the x-ray diffractograms. These percentage values do not indicate absolute determined quantities of soil minerals but do imply a relative distribution of minerals in a particular mineral suite. Absolute percentages would require additional knowledge of particle size, crystallinity, unit structure substitution, and matrix problems.

Physical Properties

Representative soils sampled for laboratory analyses in Nassau County are inherently very sandy (table 15). Many of these soils, however, have an argillic horizon in the lower part of the solum. All soils sampled, except Buccaneer soils, have one horizon or more in which the total sand content is more than 90 percent. Centenary, Corolla, Fripp, Hurricane, Newhan, Ortega, and Ridgewood soils contain more than 95 percent sand to a depth of 2 meters or more. Echaw, Kingsferry, Kureb, Mandarin, Penney, and Resota soils contain more than 90 percent sand to a depth of 2 meters or more. Albany and Meadowbrook soils and the frequently flooded Leon soils contain more than 90 percent sand to a depth of slightly more than 1 meter.

The content of clay in these excessively sandy soils is rarely more than 2 percent. Deeper argillic horizons in Albany, Buccaneer, Chaires, Goldhead, Leefield, Meadowbrook, Meggett, Ocilla, and Sapelo soils contain large amounts of clay ranging from 18.6 to 55.7 percent.

The content of silt ranges from nondetectable in the C horizon of Newhan soils to 22.6 percent in the Btg5 horizon of Buccaneer soils. All horizons sampled in Buccaneer, Chaires, Leefield, Meadowbrook, and Meggett soils contain more than 5 percent silt. All horizons sampled in Centenary, Corolla, Fripp, Kershaw, and Newhan soils contain less than 2 percent silt.

Fine sand dominates the sand fractions of all soils in the county, frequently occurring in amounts of 90 percent or more. All horizons in Kershaw soils contain more than 90 percent fine sand. The content of very fine sand is more than 20 percent in one horizon or more of Goldhead, Leefield, Meadowbrook, Meggett, and Osier soils. Except for Corolla soils, medium sands generally occur in amounts of less than 5 percent. Chaires, Corolla, Leon, and Ocilla soils contain small amounts of coarse sand; the other soils generally contain much less than 1 percent. Very coarse sand is nondetectable in most horizons of most soils. The sandy soils in Nassau County rapidly become very droughty during periods of low precipitation when rainfall is widely scattered. Conversely, these sandy soils are rapidly saturated when high amounts of rainfall occur. Soils with inherently poor drainage can remain saturated because the ground water is close to the surface for long periods. These soils include Boulogne, Buccaneer, Evergreen, Kingsferry, Leon, Meggett, and Newhan soils.

Hydraulic conductivity values exceed 39 centimeters per hour throughout all pedons of the Corolla, Kureb, Echaw, Fripp, Newhan, and Ortega soils. Similar values are recorded for many upper sandy epipedons, but the hydraulic conductivity values in the lower part of the solum in soils that have argillic horizons rarely exceed 1 centimeter per hour. Low hydraulic conductivity values at a shallow depth in soils, such as Buccaneer and Meggett soils, could affect the design and function of septic tank absorption fields. Low hydraulic conductivity values are also recorded for spodic horizons in Boulogne, Chaires, and Evergreen soils, but values in Bh horizons of Centenary, Echaw, Hurricane, and Leon soils are higher than are generally recorded for spodic horizons in most soils in Florida. The available water for plants can be estimated from bulk density and water content data. The excessively sandy soils, such as Corolla, Fripp, Hurricane, Kershaw, Kureb, Newhan, Ortega, and Resota soils, retain very low amounts of available water for plants; conversely, soils, such as Buccaneer and Meggett soils, that have a high content of fine-textured material retain much larger amounts of available water.

Chemical Properties

Chemical analyses (table 16) show that soils in the county have a wide range of extractable bases. All of the soils have one horizon or more that has less than 1 milliequivalent per 100 grams extractable bases except Buccaneer and Corolla soils and Leon fine sand, tidal. Kingsferry soils have the lowest amount of extractable bases ranging from 0.07 to 0.14 milliequivalent per 100 grams. Boulogne, Fripp, Hurricane, Kershaw, Kingsferry, Kureb, Leon, Mandarin, Ocilla, Penney, and Resota soils contain less than 1 milliequivalent per 100 grams extractable bases in all pedons. Only one horizon in Albany, Centenary, Echaw, Osier, and Sapelo soils has more than 1 milliequivalent per 100 grams extractable bases. The relatively mild, humid climate in Nassau County results in the depletion of basic soil cations (calcium, magnesium, sodium, and potassium) through leaching.

Calcium is the dominant base in most of the soils sampled; however, magnesium is dominant in Chaires, Evergreen, Goldhead, Meadowbrook, Meggett, and Ocilla soils. Sodium is dominant only in Leon fine sand, tidal. High amounts of calcium occur in all pedons of Buccaneer and Corolla soils; all of the other soils have one horizon or more that contains less than 1 milliequivalent per 100 grams calcium. The content of extractable magnesium is more than 1 millequivalent per 100 grams in one horizon or more of Buccaneer, Chaires, Evergreen, Goldhead, Meadowbrook, Meggett, and Sapelo soils and Leon fine sand, tidal. The highest content of extractable calcium and magnesium occurs in Buccaneer, Chaires, Goldhead, Meadowbrook, and Meggett soils and Leon fine sand, tidal. The content of sodium generally is much less than 0.25 milliequivalent per 100 grams; however, one horizon or more exceeded this value in the Buccaneer, Centenary, Chaires, Echaw, Evergreen, and Ridgewood soils and Leon fine sand, tidal. Fripp, Hurricane, Kershaw, Kingsferry, Newhan, Penney, and Resota soils contain 0.04 milliequivalent or less sodium to a depth of 2 meters or more. All of the soils sampled had one horizon or more that has 0.03 milliequivalent per 100 grams or less extractable potassium except Buccaneer soils and Leon fine sand, tidal. Horizons with nondetectable amounts of potassium occur in all soils except Buccaneer, Leefield, and Ocilla soils, one of the Goldhead soils, and Leon find sand, tidal.

Values for cation-exchange capacity, an indicator of plant nutrient-holding capacity, are more than 10 milliequivalents per 100 grams in the surface layer of Boulogne, Buccaneer, Echaw, Evergreen, Kureb, Meadowbrook, Osier, and Sapelo soils, one of the Chaires soils, and Leon fine sand, tidal. A large cation-exchange capacity parallels the higher content of clay in the deeper horizons of Albany, Buccaneer, Chaires, Goldhead, Leefield, Meadowbrook, Meggett, Ocilla, and Sapelo soils. Soils, such as Fripp and Newhan soils, that have a low cation-exchange capacity in the surface layer require only small amounts of lime or sulfur to significantly alter their base status and soil reaction. Generally, soils of low inherent soil fertility are associated with low values for extractable bases and low cation-exchange capacity. Fertile soils are associated with high extractable base values, high base saturation values, and high cation-exchange capacities.

The content of organic carbon is less than 1 percent in Centenary, Corolla, Fripp, Hurricane, Kershaw, Newhan, Ocilla, and Ridgewood soils and in all of the horizons below the surface layer in Albany, Buccaneer, Goldhead, Kureb, Leefield, Meadowbrook, Meggett, Ortega, Osier, Penney, and Resota soils. Echaw, Evergreen, Kingsferry, and Sapelo soils have horizons that contain more than 3 percent organic carbon. Boulogne, Centenary, Chaires, Echaw, Evergreen, Hurricane, Kingsferry, Leon, Mandarin, and Sapelo soils have Bh horizons that contain large amounts of organic carbon that range from 0.26 percent in Hurricane soils to 4.20 percent in Sapelo soils. In all other soils sampled, the content of organic carbon decreases rapidly as depth increases. Since the content of organic carbon in the surface layer is directly related to the soil nutrient- and water-holding capacities of sandy soils, management practices that conserve and maintain the content of organic carbon are highly desirable.

Electrical conductivity values are high only in Leon fine sand, tidal. They range from 2.03 to 13.00 millimhos per centimeter. In several horizons of the Leon soil that is on flatwoods and in the surface layer of Kureb soils, values range from 1.40 to 3.84 millimhos per centimeter. Electrical conductivity values generally are less than 0.10 millimhos per centimeter in all other soils sampled, and in the pedons of Albany, Boulogne, Buccaneer, and Kershaw soils, the values are not detectable. These data indicate that the content of soluble salt in soils sampled in Nassau County is insufficient to detrimentally affect the growth of salt-sensitive plants except in areas adjacent to the coast.

Soil reaction in water generally ranges between pH 4.5 and 6.0; however, reactions as much as pH 7.0 and above occur in Buccaneer, Corolla, Fripp, and Newhan soils. With few exceptions, soil reaction values are about 0.5 to 1.0 pH unit lower in calcium chloride and potassium chloride than in water. The maximum plant nutrient availability is generally attained when soil reaction is between pH 6.5 and 7.5; however, under Florida conditions, maintaining soil reaction above pH 6.5 is not economically feasible for most agricultural production purposes.

The ratio of sodium pyrophosphate extractable carbon and aluminum to clay in the Bh horizon of Boulogne, Centenary, Chaires, Echaw, Evergreen, Hurricane, Kingsferry, Leon, Mandarin, and Sapelo soils is sufficient to meet the chemical criteria for spodic horizons. Field morphology is used to determine spodic horizons in Leon fine sand, tidal. The Bh horizon in these soils does not meet all the chemical criteria for spodic horizons. Pyrophosphate extractable iron and aluminum are sufficient to meet the spodic horizon criteria for all Spodosols. Sodium pyrophosphate extractable iron is less than 0.09 percent in the spodic horizon in all of these soils except Hurricane soils, which contain 0.13 percent extractable iron.

Citrate-dithionite extractable iron in the Bt horizon of Albany, Buccaneer, Goldhead, Leefield, Meadowbrook, Meggett, and Ocilla soils ranges from 0.18 to 3.46 percent and is frequently less than 1.0 percent. Aluminum extracted by citrate-dithionite from the Bt horizon in these soils ranges from 0.03 to 0.33 percent. A larger amount of citrate-dithionite extractable iron generally occurs in the Bt horizon as compared to that in the Bh horizon. The amount of iron and aluminum in the soils in the county is not sufficient to detrimentally affect phosphorus availability.

Mineralogical Properties

Sand fractions of 2.0 millimeters to 0.05 millimeter are siliceous, and quartz is overwhelmingly dominant in all pedons. Varying amounts of heavy minerals are in most horizons with the greatest concentration in the very fine sand fraction. No weatherable minerals are observed. Crystalline mineral components of the clay fraction of less than 0.002 millimeter are shown in table 17 for major horizons of the pedons sampled. The clay mineralogical suite is made up mostly of montmorillonite, a 14-angstrom intergrade, kaolinite, and quartz.

Montmorillonite occurs in all of the soils sampled except in Evergreen, Hurricane, Kingsferry, and Leon soils. The 14-angstrom intergrade mineral occurs in most of the soils sampled but is not detectable in the pedons of Buccaneer, Fripp, and Newhan soils. Kaolinite and varying amounts of quartz occur throughout all of the soils sampled. The content of calcite, mica, and gibbsite is insufficient for the assignment of numerical values.

Montmorillonite in the soils in Nassau County was generally inherited from the sediments in which these soils formed. The stability of montmorillonite is generally favored by a high level of pH or an alkaline condition. Montmorillonite generally is more abundant in areas where the alkaline elements have not been leached by percolating rainwater; however, montmorillonite can occur in moderate amounts regardless of drainage or chemical conditions.

The 14-angstrom intergrade, a mineral of uncertain origin, is widespread in soils in Florida. It tends to be more prevalent under moderately acidic, relatively well drained conditions, although it occurs in a variety of soil environments. This soil mineral is a minor constituent of sand grain coatings in Hurricane, Kershaw, Ortega, and Ridgewood soils; however, the amount of coatings that occur in these soils is not sufficient to meet the established taxonomic criteria for the recognition of coated Typic Quartzipsamments.

Kaolinite was most likely inherited from the parent material; however, it may have formed as a weathering product of other minerals. Kaolinite is relatively stable in the acidic environment of the soils in the county. Clay-size quartz has primarily resulted from decrements of the silt fraction.

Clay mineralogy can have a significant impact on soil properties, particularly for soils that have a higher content of clay. Soils that contain montmorillonite clay have a higher capacity for retention of plant nutrients than soils dominated by kaolinite, 14-angstrom intergrade minerals, or quartz. The large content of montmorillonitic clay that occurs in Buccaneer and Meggett soils creates problems for most types of construction because of the large amounts of swelling when the clay is wet and shrinking when it is dry. The clay mineralogy influences the use and management of most soils in the county less frequently than the total content of clay.

Engineering Index Test Data

Table 18 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the Materials Office, Florida Department of Transportation.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); and Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(14)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 19 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol.* An example is Spodosol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquod (*Aqu*, meaning water, plus *od*, from Spodosol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquods (*Hapl*, meaning minimal horizonation, plus *aquod*, the suborder of the Spodosols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquods.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is sandy, siliceous, thermic Typic Haplaquods.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (13)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (14)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Albany Series

The Albany series consists of nearly level and gently sloping, somewhat poorly drained soils. These soils formed in thick deposits of sandy and loamy material. They are on narrow to broad ridges and on isolated knolls. These soils are moderately slowly permeable. Generally, the water table is at a depth of 12 to 30 inches for 1 to 4 months of the year and at a depth of 30 to 48 inches for 4 to 8 months or more. Slopes range from 0 to 5 percent. The Albany soils are loamy, siliceous, thermic Grossarenic Paleudults.

The Albany soils are closely associated on the landscape with Blanton, Ellabelle, Hurricane, Ocilla, Ortega, Goldhead, Meadowbrook, Ridgewood, and Sapelo soils. Blanton, Hurricane, Ocilla, and Ridgewood soils are in landscape positions similar to those of the Albany soils. Hurricane soils have a spodic horizon. Ocilla soils have an argillic horizon at a depth of 20 to 40 inches. Ridgewood soils do not have an argillic horizon. Ellabelle soils are very poorly drained and are in drainageways. Ortega soils are moderately well drained and are on higher elevated ridges and knolls than the Albany soils. Goldhead, Meadowbrook, and Sapelo soils are poorly drained. Goldhead and Meadowbrook soils are in sloughs. Sapelo soils have a spodic horizon and are on flatwoods.

Typical pedon of Albany fine sand, 0 to 5 percent slopes; in a wooded area, approximately 5 miles north of Yulee, 150 feet north of Crandall Road, 2.45 miles northeast of U.S. Highway 17, Land Grant 48, T. 3 N., R. 27 E.

A—0 to 2 inches; very dark gray (10YR 3/1) fine sand; weak medium granular structure; very friable; many fine and common medium roots; very strongly acid; abrupt smooth boundary.

E1—2 to 5 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; common fine and medium roots; very strongly acid; clear wavy boundary.

E2—5 to 17 inches; light yellowish brown (10YR 6/4) fine sand; few fine faint light brownish gray (10YR 6/2) uncoated sand grains; single grained; loose; few fine and medium roots; medium acid; gradual wavy boundary.

E3—17 to 36 inches; light yellowish brown (10YR 6/4) fine sand; common light brownish gray (10YR 6/2) mottles; single grained; loose; few fine roots; strongly acid; gradual wavy boundary.

E4—36 to 50 inches; light gray (10YR 7/2) fine sand; few medium distinct brownish yellow (10YR 6/6) and few fine prominent yellowish brown (10YR 5/6) mottles; single grained; loose; few fine roots; strongly acid; clear wavy boundary.

BE—50 to 56 inches; yellowish brown (10YR 5/6) fine sandy loam; few fine distinct grayish brown (10YR 5/2) mottles; weak fine subangular blocky structure; very friable; few fine roots; sand grains coated with clay; very strongly acid; clear wavy boundary.

Btg1—56 to 62 inches; grayish brown (10YR 5/2) sandy clay loam; common medium distinct strong brown (7.5YR 5/8) and few medium distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; extremely acid; gradual wavy boundary.

Btg2—62 to 80 inches; olive gray (5Y 5/2) fine sandy loam; few medium prominent red (2.5YR 4/6) and common medium prominent yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; friable; extremely acid.

The thickness of the solum ranges from 80 to 96 inches. Reaction ranges from extremely acid to slightly acid in the A horizon and extremely acid to medium acid in the E, BE, and Btg horizons. The depth to the argillic horizon is 40 to 78 inches.

The A horizon has hue of 10YR, value of 3 to 6, and chroma of 1 or 2. It is 2 to 8 inches thick.

The upper part of the E horizon has hue of 10YR, value of 5 to 7, and chroma of 3 or 4. Mottles are in shades of white, gray, yellow, olive, brown, and red. Mottles having chroma of 2 or less are within 30 inches of the surface. The thickness of the upper part ranges from 25 to 65 inches. The lower part of the E horizon has hue of 10YR, value of 6 to 8, and chroma of 1 or 2. Mottles are in shades of yellow, olive, brown, and red. The thickness of the lower part ranges from 5 to 30 inches.

The BE horizon has hue of 10YR, value of 4 to 8, and chroma of 4 to 6. Mottles are in shades of gray, yellow, brown, and red. The texture is loamy fine sand or fine sandy loam. This horizon is as much as 6 inches thick. Some pedons do not have a BE horizon. The Btg horizon to a depth of 80 inches or more has hue of 10YR to 5Y or is neutral in hue. It has value of 5 to 7 and chroma of 0 to 3. Mottles are in shades of brown, yellow, gray, and red. In some pedons, the Btg horizon does not have a matrix color and is mottled red, yellow, brown, and gray. The lower part of the Btg horizon may be gleyed. The content of plinthite in the Btg horizon is less than 5 percent. The texture is fine sandy loam or sandy clay loam.

Blanton Series

The Blanton series consists of nearly level to moderately steep, somewhat poorly drained and moderately well drained soils. These soils formed in thick deposits of sandy and loamy sediments. They are on narrow to broad ridges, on side slopes, and on isolated knolls. These soils are moderately permeable. Generally, the water table is at a depth of 30 to 48 inches for 1 to 3 months of the year and at a depth of 48 to 60 inches for 4 to 8 months or more. Slopes range from 0 to 20 percent. The Blanton soils are loamy, siliceous, thermic Grossarenic Paleudults.

The Blanton soils are closely associated on the landscape with Albany, Ellabelle, Hurricane, Ocilla, Ortega, Goldhead, Meadowbrook, Ridgewood, and Sapelo soils. Albany, Hurricane, Ocilla, Ortega, and Ridgewood soils are in landscape positions similar to those of the Blanton soils. Hurricane soils have a spodic horizon. Ocilla soils have an argillic horizon. Ortega soils do not have an argillic horizon. Ridgewood soils do not have an argillic or a spodic horizon. Ellabelle soils are very poorly drained and are in drainageways. Goldhead and Meadowbrook soils are poorly drained and very poorly drained and are in sloughs. Sapelo soils have a spodic horizon and are on flatwoods.

Typical pedon of Blanton fine sand, 0 to 5 percent slopes; in a wooded area, approximately 0.35 mile south of the intersection of Nassau County Roads 121 and 108, about 500 feet west of County Road 121, NE¼SW¼NE¼ sec. 27, T. 1 N., R. 23 E.

A—0 to 6 inches; dark grayish brown (10YR 4/2) fine sand; weak fine granular structure; very friable; many fine, common medium, and few coarse roots; very strongly acid; clear smooth boundary.

E1—6 to 18 inches; pale brown (10YR 6/3) fine sand; common fine distinct black (10YR 2/1) charcoal fragments; single grained; loose; common fine and few medium roots; very strongly acid; diffuse wavy boundary.

E2—18 to 42 inches; pale brown (10YR 6/3) fine sand; few fine prominent brownish yellow (10YR 6/6) and common medium faint light gray (10YR 7/2) mottles; single grained; loose; few fine roots; many uncoated sand grains; very strongly acid; clear smooth boundary.

E3—42 to 56 inches; light gray (10YR 7/1) fine sand; few fine prominent brownish yellow (10YR 6/6) streaks; single grained; loose; few fine roots; very strongly acid; abrupt wavy boundary.

Bt—56 to 62 inches; brownish yellow (10YR 6/6) sandy clay loam; weak fine subangular blocky structure; friable; sand grains bridged and coated with clay; few fine roots; very strongly acid; clear smooth boundary.

Btg1—62 to 70 inches; brownish yellow (10YR 6/6) sandy clay loam; common fine distinct reddish yellow (7.5YR 6/6) and light gray (10YR 7/2) and few fine distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; sand grains bridged and coated with clay; few fine roots; very strongly acid; gradual wavy boundary.

Btg2—70 to 80 inches; mixed light gray (10YR 7/2), brownish yellow (10YR 6/6), and strong brown (7.5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable; sand grains bridged and coated with clay; very strongly acid.

The thickness of the solum ranges from 80 to 96 inches or more. Reaction ranges from very strongly acid to slightly acid in the A horizon and from extremely acid to medium acid in the E, Bt, and Btg horizons. The depth to the argillic horizon is 40 to 78 inches.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. It is 5 to 8 inches thick.

The E horizon has hue of 10YR, value of 6 to 8, and chroma of 1 to 4. Mottles are in shades of yellow, olive, brown, and red. This horizon is 5 to 50 inches thick.

Some pedons have a Bw horizon that has hue of 10YR, value of 5 to 7, and chroma of 3 or 4. Mottles are in shades of white, gray, yellow, olive, brown, and red. Mottles having chroma of 2 or less are within 30 inches of the surface. This horizon is 25 to 65 inches thick.

Some pedons have a BE horizon that has hue of 10YR, value of 4 to 8, and chroma of 3 to 6. Mottles are in shades of gray, yellow, brown, and red. The texture is loamy fine sand or fine sandy loam. This horizon is as much as 4 inches thick.

The Bt and Btg horizons have hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 to 6; hue of 2.5Y, value of 5 to 7, and chroma of 1 or 2; or hue of 2.5Y, value of 5 to 7, and chroma of 2. Mottles are in shades of brown, yellow, gray, and red. The content of plinthite is less than 5 percent. The texture is fine sandy loam or sandy clay loam. The Btg horizon extends to a depth of 80 inches or more.

Boulogne Series

The Boulogne series consists of nearly level, poorly drained, acid soils. These soils formed in thick, sandy deposits on marine terraces. They are on flatwoods. These soils are slowly permeable. Generally, the water table is at a depth of 6 to 18 inches for 1 to 6 months of the year and at a depth of 12 to 42 inches for 4 to 8 months or longer. Slopes are smooth and are 0 to 2 percent. The Boulogne soils are sandy, siliceous, thermic Typic Haplaquods.

The Boulogne soils are closely associated on the landscape with Evergreen, Hurricane, Leon, and Kingsferry soils. Evergreen soils are in depressions and are very poorly drained. Hurricane soils are somewhat poorly drained, have a spodic horizon below a depth of 50 inches, and are on slightly elevated ridges. Leon and Kingsferry soils are on flatwoods. Kingsferry soils have a spodic horizon at a depth of 30 to 50 inches and are very poorly drained.

Typical pedon of Boulogne fine sand; in a wooded area, approximately 5 miles south-southwest of Callahan, 50 feet east of Container Road, 0.2 mile north of railroad tracks, SW¼NW¼ sec. 13, T. 1 N., R. 24 E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) fine sand; moderate medium granular structure; very friable; many fine and medium roots; extremely acid; clear wavy boundary.

A—7 to 10 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; very friable; common fine and few medium roots; discontinuous pockets of light gray (10YR 6/1) in lower part, ½ inch to 2 inches long and 3 to 9 inches wide; extremely acid; abrupt wavy boundary.

Bh—10 to 13 inches; dark brown (7.5YR 3/2) fine sand; massive; very friable; common fine and few medium roots; sand grains coated with organic matter; very strongly acid; clear wavy boundary.

E1—13 to 19 inches; grayish brown (10YR 5/2) fine sand; common medium faint brown (10YR 5/3) mottles; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

E2—19 to 26 inches; dark grayish brown (10YR 4/2) fine sand; common fine distinct light brownish gray (10YR 6/2) and common medium distinct yellowish brown (10YR 5/4) mottles; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

E3—26 to 33 inches; light gray (10YR 7/2) fine sand; common medium faint very pale brown (10YR 7/3) mottles; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

B'h1—33 to 40 inches; dark brown (7.5YR 3/2) loamy fine sand; common medium distinct black (5YR 2/1) Bh fragments; discontinuous small pockets of pale brown (10YR 6/3) in upper part; massive; very friable; few fine roots; sand grains weakly coated with organic matter; very strongly acid; gradual wavy boundary.

B'h2—40 to 54 inches; black (5YR 2/1) loamy fine sand; massive; friable; few fine roots; sand grains well coated with organic matter; very strongly acid; gradual wavy boundary.

B'h3—54 to 80 inches; dark reddish brown (5YR 2/2) and black (5YR 2/1) loamy fine sand; massive; very firm, weakly cemented; sand grains thickly coated with organic matter; very strongly acid.

Reaction ranges from extremely acid to medium acid. The texture is fine sand except in the B'h horizon, which is fine sand or loamy fine sand.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2.

Some pedons have an incipient E horizon, about 2 inches thick, between the A and Bh horizon. This E horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2.

The Bh horizon has hue of 5YR, value of 2 or 3, and chroma of 1 to 3; hue of 7.5YR, value of 3, and chroma of 2 or 3; or hue of 10YR, value of 3, and chroma of 2.

The E horizon, if it occurs, has hue of 10YR, value of 4 to 7, and chroma of 1 or 2.

Some pedons have a thin transitional layer of loamy fine sand between the E and B'h horizons. This layer has streaks of fine sandy loam. It is as much as 6 inches thick.

The B'h horizon has hue of 7.5YR, value of 3, and chroma of 2 or hue of 5YR, value of 2 or 3, and chroma of 1 or 2. The lower part of the B'h horizon is weakly cemented in more than half of the horizon in each pedon. The B'h horizon is very friable or friable in the upper part and firm or very firm in the lower part. Depth to the firm or very firm, weakly cemented B'h horizon is more than 50 inches.

Brookman Series

The Brookman series consists of nearly level, very poorly drained soils. These soils formed in marine deposits of loamy and clayey sediments. They are in depressions. These soils are slowly permeable. Generally, the water table is at or above the surface for 6 to 9 months each year. Slopes are concave and are 0 to 2 percent. The Brookman soils are fine, mixed, thermic Typic Umbraqualfs.

The Brookman soils are closely associated on the landscape with Meggett, Goldhead, and Buccaneer soils. Meggett soils do not have an umbric epipedon and are on broad, low flats. Goldhead soils have sandy

A and E horizons that are 20 to 40 inches thick and contain less than 35 percent clay in the upper 20 inches of the argillic horizon. Buccaneer soils are in landscape positions similar to those of the Brookman soils.

Typical pedon of Brookman mucky fine sandy loam, depressional; in a wooded depressional area, 0.1 mile south of Containers Hunting Road, 0.1 mile west of Containers Dog Box Road, SW¼SW¼ sec. 7, T. 3 N., R. 25 W.

A—0 to 8 inches; black (10YR 2/1) mucky fine sandy loam; moderate medium granular structure; friable; many fine, medium, and coarse roots; a high content of organic matter; strongly acid; clear smooth boundary.

Btg1—8 to 12 inches; black (10YR 2/1) sandy clay loam; moderate medium subangular blocky structure; friable; common fine and medium and few coarse roots; patchy clay films on faces of peds; strongly acid; gradual wavy boundary.

Btg2—12 to 22 inches; very dark gray (10YR 3/1) sandy clay; weak moderate subangular blocky structure; firm; few fine roots; patchy clay films on faces of peds; strongly acid; gradual wavy boundary.

Btg3—22 to 45 inches; dark gray (10YR 4/1) clay; weak coarse subangular blocky structure; very firm; clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg4—45 to 65 inches; dark gray (10YR 4/1) clay; common medium faint gray (10YR 5/1) and common medium prominent strong brown (7.5YR 5/8) mottles; weak coarse subangular blocky structure; very firm; clay films on faces of peds; strongly acid; gradual wavy boundary.

Btg5—65 to 80 inches; light olive gray (5Y 6/2) clay; common medium prominent strong brown (7.5YR 5/8) and yellowish red (5YR 4/6) and common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; very firm; clay films on faces of peds; strongly acid.

The solum is more than 60 inches thick.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is 8 to 22 inches thick. The texture is mucky fine sandy loam or clay loam.

The Btg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 3 to 7 and chroma of 0 to 2. Mottles in shades of gray, yellow, brown, and red generally are in the lower part of the horizon. The texture of the Btg horizon is sandy clay loam, clay, or sandy clay. In some pedons lenses of sandy material are in the lower part of the Btg horizon.

Buccaneer Series

The Buccaneer series consists of nearly level, very poorly drained soils. These soils formed in clayey marine sediment. They are in large drainageways, in swamps, and on low hammocks. These soils are very slowly permeable. Generally, the water table is at or above the surface for 6 to 9 months of the year. These soils are subject to flooding. Slopes are concave and are 0 to 2 percent. The Buccaneer soils are fine, montmorillonitic, thermic Typic Argiaquolls.

The Buccaneer soils are closely associated on the landscape with Brookman, Meggett, Ellabelle, Chaires, Goldhead, and Croatan soils. Brookman, Ellabelle, and Croatan soils are in landscape positions similar to those of the Buccaneer soils. Brookman soils have an umbric epipedon. Ellabelle soils have a loamy subsoil at a depth of 20 to 40 inches. Croatan soils have a histic epipedon. Meggett and Goldhead soils are on broad, low flats. Chaires soils are on flatwoods.

Typical pedon of Buccaneer clay, frequently flooded; in a wooded area, approximately 4.5 miles east-northeast of Hilliard, 1.2 miles north of Nassau County Road 108, 0.2 mile south of Little St. Marys River, NW¼SW¼NE¼ sec. 6, T. 3 N., R. 25 E.

A—0 to 5 inches; black (10YR 2/1) clay; weak fine granular structure; slightly sticky and slightly plastic; many fine and medium roots; medium acid; clear wavy boundary.

Btg1—5 to 18 inches; very dark gray (N 3/0) clay; weak coarse subangular blocky structure; sticky and plastic; common fine roots; few distinct clay films on faces of most peds; neutral; gradual wavy boundary.

Btg2—18 to 30 inches; dark gray (10YR 4/1) clay; common medium faint very dark gray (10YR 3/1) streaks; weak coarse subangular blocky structure; very plastic and very sticky; few fine roots; few distinct clay films on faces of peds; neutral; gradual smooth boundary.

Btg3—30 to 48 inches; dark gray (10YR 4/1) clay; few medium distinct very dark gray (N 3/0) streaks; common medium prominent gray (5Y 5/1) mottles; weak coarse subangular blocky structure; very plastic and very sticky; few fine roots; few faint clay films on faces of peds; neutral; gradual wavy boundary.

Btg4—48 to 65 inches; gray (5Y 6/1) clay; common medium distinct olive (5Y 5/4) and dark gray (N 4/0) mottles; few fine distinct very dark gray (N 3/0) streaks; moderate coarse subangular blocky structure; very plastic and very sticky; few fine roots; few faint clay films on faces of peds; neutral; gradual wavy boundary.

Cg—65 to 80 inches; light olive gray (5Y 6/2) clay; few medium distinct dark gray (N 4/0) streaks; many medium distinct olive (5Y 5/6) mottles; massive; very plastic and very sticky; few fine roots; neutral.

The thickness of the solum is 50 inches or more. Reaction is strongly acid to neutral in the A horizon, medium acid to mildly alkaline in the Btg horizon, and slightly acid to moderately alkaline in the Cg horizon. The base saturation is more than 50 percent in the A horizon and may be as much as 80 percent or more at a depth of 36 to 72 inches. The particle-size control section has less than 30 percent silt.

The A horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 or 1. The texture is clay loam, sandy clay, or clay.

The upper part of the Btg horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 or 1. The lower part of the horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. Mottles are in shades of red, brown, yellow, and olive in some pedons. The texture is clay or sandy clay.

The Cg horizon has hue of 5Y, 5G, or 5GY or is neutral in hue. It has value of 5 or 6 and chroma of 0 to 2. Mottles are in shades of gray and olive.

Centenary Series

The Centenary series consists of nearly level and gently sloping, moderately well drained soils. These soils formed in thick deposits of marine sands. They are on narrow to broad ridges and on isolated knolls. These soils are moderately rapidly permeable. Generally, the water table is at a depth of 42 to 60 inches for 2 to 4 months of the year and recedes to a depth of more than 60 inches during the rest of the year. Slopes are smooth to convex and range from 0 to 5 percent. The Centenary soils are sandy, siliceous, thermic Grossarenic Entic Haplohumods.

The Centenary soils are closely associated on the landscape with Hurricane, Kershaw, Mandarin, Ortega, and Ridgewood soils. Hurricane, Mandarin, and Ridgewood soils are poorly drained and are in lower positions on the landscape than the Centenary soils. Ridgewood, Kershaw, and Ortega soils do not have a spodic horizon. Kershaw soils are on higher elevated ridges and knolls than the Centenary soils. Ortega soils are in landscape positions similar to those of the Centenary soils.

Typical pedon of Centenary fine sand, 0 to 5 percent slopes; in a wooded area, 50 feet north of Rodeo Avenue, 0.75 mile east of U.S. Highway 17, about 1.8 miles south of Florida State Highway A1A, about 2.1 miles south of Yulee, Land Grant 42, T. 2 N., R. 27 E.

A1—0 to 3 inches; dark gray (10YR 4/1) fine sand; weak medium granular structure; very friable; many fine and common medium roots; very strongly acid; abrupt smooth boundary.

A2—3 to 7 inches; grayish brown (10YR 5/2) fine sand; common medium faint brown (10YR 5/3) mottles; weak fine granular structure; very friable; many fine, common medium, and few coarse roots; slightly acid; clear wavy boundary.

E1—7 to 26 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; common fine and few medium and coarse roots; very strongly acid; gradual wavy boundary.

E2—26 to 36 inches; light yellowish brown (10YR 6/4) fine sand; common medium faint light brownish gray (10YR 6/2) mottles; single grained; loose; common fine roots; very strongly acid; gradual wavy boundary.

E3—36 to 46 inches; light gray (10YR 7/2) fine sand; common medium distinct light yellowish brown (10YR 6/4) and few fine prominent yellowish red (5YR 4/6) mottles; single grained; loose; few fine roots; extremely acid; gradual wavy boundary.

E4—46 to 66 inches; light gray (10YR 7/1) fine sand; common medium faint light brownish gray (10YR 6/2) mottles; single grained; loose; extremely acid; clear wavy boundary.

Bh1—66 to 70 inches; dark brown (7.5YR 3/2) fine sand; massive; very friable; common uncoated sand grains; extremely acid; clear wavy boundary.

Bh2—70 to 80 inches; dark reddish brown (5YR 2/2) fine sand; massive; friable; sand grains well coated with organic matter; extremely acid.

The solum is more than 80 inches thick. Depth to the Bh horizon ranges from 50 to 80 inches. Mottles having chroma of 2 or less are within 40 inches of the surface. Reaction is very strongly acid to slightly acid in the A horizon, except where lime has been added, and is extremely acid to medium acid throughout the rest of the profile.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is 3 to 9 inches thick.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 to 4. Mottles are in shades of yellow, brown, red, and gray. This horizon is 45 to 65 inches thick.

The Bh horizon to a depth of more than 80 inches has hue of 5YR to 10YR or is neutral in hue. It has value of 2 to 4 and chroma of 0 to 2.

Chaires Series

The Chaires series consists of nearly level, poorly drained soils. These soils formed in marine deposits of sandy and loamy sediments. They are on broad flatwoods. These soils are moderately slowly permeable. Generally, the water table is at a depth of 6 to 18 inches for 1 to 4 months of the year during periods of heavy rainfall. It is at a depth of 12 to 40 inches for 4 to 9 months. Slopes are smooth or convex and are 0 to 2 percent. The Chaires soils are sandy, siliceous, thermic Alfic Haplaquods.

The Chaires soils are closely associated on the landscape with Blanton, Croatan, Ellabelle, Leon, Ocilla, Goldhead, Meggett, and Buccaneer soils. Blanton, Croatan, Ellabelle, Ocilla, Goldhead, and Meggett soils do not have a spodic horizon. Blanton and Ocilla soils are somewhat poorly drained and are on slightly elevated ridges. Croatan soils are in depressions. Ellabelle soils are very poorly drained and are in swamp hardwood drainageways. Goldhead and Meggett soils are in sloughs on flatwoods and in depressions. Leon soils do not have an argillic horizon below a depth of 40 inches and are on flatwoods. Buccaneer soils are in lower positions on the landscape than the Chaires soils.

Typical pedon of Chaires fine sand; in a wooded area, 4.5 miles northeast of Callahan, 0.9 mile north of Florida State Highways A1A and 200, about 200 feet west of a logging trail under a power line, Land Grant 41, T. 2 N., R. 25 E.

A—0 to 7 inches; black (10YR 2/1) fine sand; common medium faint very dark gray (10YR 3/1) streaks; moderate medium granular structure; friable; many fine and common and few coarse roots; extremely acid; clear smooth boundary.

E—7 to 18 inches; gray (10YR 5/1) fine sand; common medium faint dark gray (10YR 4/1) streaks; single grained; loose; many fine, common medium, and few coarse roots; very strongly acid; clear wavy boundary.

Bh1—18 to 22 inches; black (5YR 2/1) fine sand; massive; firm; few fine and medium roots; sand grains coated with organic matter; extremely acid; clear wavy boundary.

Bh2—22 to 27 inches; dark reddish brown (5YR 3/3) fine sand; common medium faint dark reddish brown (5YR 2/2) bodies; massive; firm; few fine roots; sand grains coated with organic matter; very strongly acid; clear wavy boundary.

BE—27 to 31 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; few fine roots; very strongly acid; abrupt wavy boundary.

Btg1—31 to 36 inches; light brownish gray (2.5Y 6/2) sandy clay loam; many fine distinct yellowish brown (10YR 5/8) mottles along root channels; moderate medium subangular blocky structure; friable; few fine roots; sand grains bridged and coated with clay; very strongly acid; clear wavy boundary.

Btg2—36 to 50 inches; light gray (10YR 7/2) sandy clay loam; common medium yellowish brown (10YR 5/8) and common fine distinct strong brown (7.5YR 5/8) mottles along root channels; moderate medium subangular blocky structure; friable; few fine roots; sand grains bridged and coated with clay; very strongly acid; gradual wavy boundary.

Btg3—50 to 65 inches; light gray (10YR 7/2) sandy clay loam; many medium distinct yellowish brown (10YR 5/8) and common medium prominent red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; sand grains bridged and coated with clay; strongly acid; gradual wavy boundary.

Btg4—65 to 80 inches; light brownish gray (2.5Y 6/2) fine sandy loam; common medium prominent red (2.5YR 4/6) and few medium distinct yellowish brown (10YR 5/6) mottles; strong coarse subangular blocky structure; firm; sand grains bridged and coated with clay; strongly acid.

Depth to the Bh horizon ranges from 10 to 30 inches (fig. 10) and depth to the Bt horizon from 25 to 40 inches. Reaction ranges from extremely acid to strongly acid in the surface layer and in the subsoil and from extremely acid to medium acid in the C horizon.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1. It is 5 to less than 10 inches thick.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. Some pedons have mottles of yellow and brown. In some pedons a thin transitional layer is at the base of the E horizon. It has hue of 10YR, value of 2 to 4, and chroma of 1 or 2 or is neutral in hue and has value of 2. This transitional layer has many uncoated sand grains and small pockets or streaks of

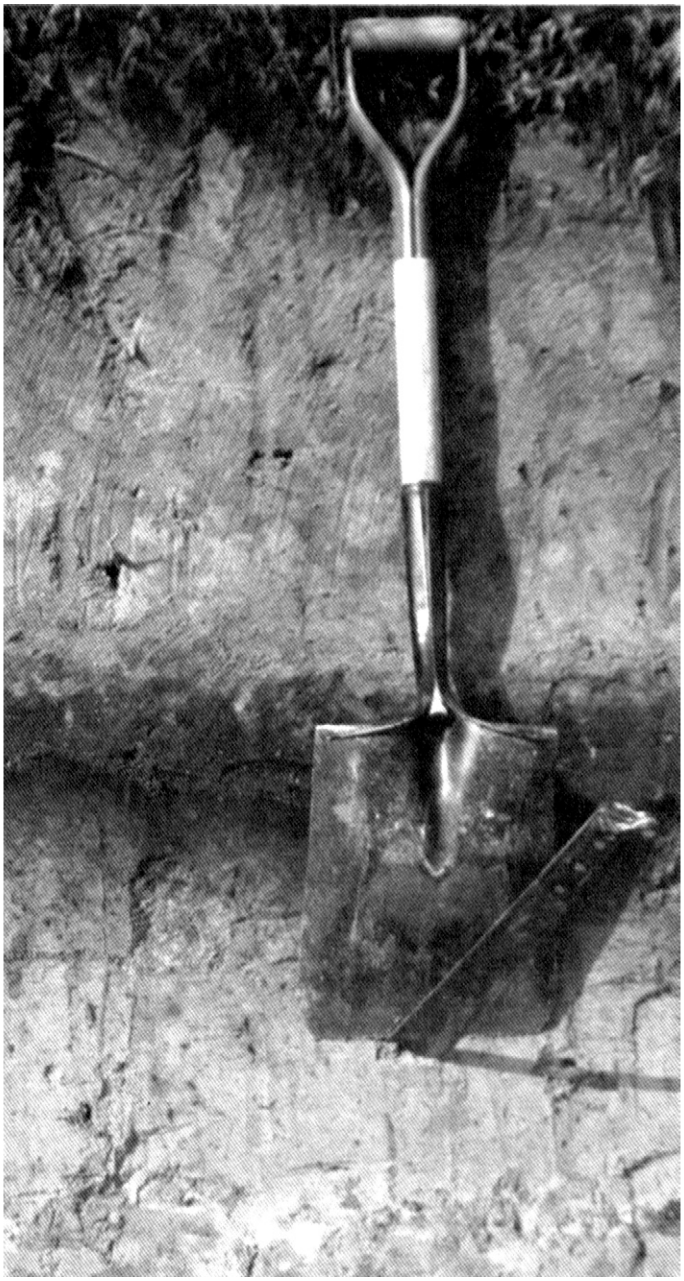


Figure 10.—A profile of Chaires fine sand. Depth to the dark color in the subsoil is less than 30 inches.

gray or light gray. This horizon is 5 to 16 inches thick.

The Bh horizon has hue of 2.5YR, value of 2 or 3, and chroma of 2 to 4; has hue of 5YR, value of 2 or 3, and chroma of 1 to 3; has hue of 7.5YR, value of 3 to 5, and chroma of 2 or 3; has hue of 10YR, value of 2 or 3, and chroma of 1 or 2; or is neutral in hue and has value of 2. The texture of the Bh horizon is fine sand or loamy fine sand. This horizon is 5 to 20 inches thick.

The BE horizon has hue of 10YR, value of 3 to 6, and chroma of 3 or hue of 7.5YR and value and chroma of 4. The texture is fine sand or loamy fine sand. In some pedons the BE horizon contains Bh fragments. The BE horizon is as much as 9 inches thick.

Some pedons have an E′ horizon that has hue of 10YR, value of 5 to 7, and chroma of 1 or 2 or hue of 2.5Y, value of 5 to 7, and chroma of 2. Some pedons have mottles of brown and gray. The texture is fine sand. This horizon is as much as 8 inches thick.

The Btg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2; has hue of 2.5Y, value of 5 or 6, and chroma of 2; or is neutral and has value of 4 to 7. Mottles are in shades of yellow, brown, and red. The texture is fine sandy loam or sandy clay loam. The average clay content is about 18 to 23 percent but can range from about 14 to 35 percent. This horizon is 10 to 34 inches thick.

Some pedons have a C horizon that has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. The texture is fine sand or loamy fine sand. This horizon extends to a depth of 80 inches or more.

The Chaires soils in this county are taxadjuncts because the loamy part of the subsoil is closer to the surface than is defined as the range for the series. This difference does not significantly affect the use and management of the soils.

Corolla Series

The Corolla series consists of gently sloping and sloping, moderately well drained and somewhat poorly drained soils. These soils formed from marine sand reworked by wind and wave action. They are on narrow, low, gently undulating dunes generally near beaches along the Atlantic coast. These soils are very rapidly permeable. Generally, the water table is at a depth of about 18 to 36 inches for 2 to 6 months of the year and below a depth of 36 inches for the rest of the year. Slopes are convex and concave and range from 2 to 6 percent. The Corolla soils are thermic, uncoated Aquic Quartzipsamments.

The Corolla soils are closely associated on the landscape with Beaches and with Fripp and Newhan soils. Beaches are flooded daily by ocean tides. Fripp and Newhan soils are on higher elevated sand dunes than the Corolla soils and are better drained.

Typical pedon of Corolla fine sand, 2 to 6 percent slopes, rarely flooded; on a dune in Fernandina Beach, 100 yards north of junction of Sixth Street and Mary Street, sec. 9, T. 3 N., R. 29 E.

A—0 to 6 inches; very pale brown (10YR 7/3) fine sand; single grained; loose; common fine and few medium roots; few very fine black minerals; slightly acid; clear smooth boundary.

C1—6 to 12 inches; pale brown (10YR 6/3) fine sand; single grained; loose; common fine and few medium roots; few very fine black minerals; few fine shell fragments, 1 to 3 millimeters in size; neutral; clear smooth boundary.

C2—12 to 20 inches; light yellowish brown (10YR 6/4) fine sand; single grained; few fine roots; few very fine black minerals; few fine shell fragments, 1 to 3 millimeters in size; neutral; clear smooth boundary.

C3—20 to 26 inches; pale brown (10YR 6/3) sand; single grained; loose; few fine roots; few very fine black minerals; common fine shell fragments, 1 to 5 millimeters in size; neutral; clear smooth boundary.

C4—26 to 41 inches; light gray (10YR 7/2) sand; single grained; loose; few fine roots; few very fine black minerals; common fine shell fragments in thin horizontal layers, 1 to 3 millimeters in size; neutral; abrupt smooth boundary.

C5—41 to 80 inches; light gray (10YR 7/2) sand; single grained; loose; few very fine black minerals; many fine shell fragments, 1 to 10 millimeters in size, and few whole shells; mildly alkaline.

The combined thickness of the A and C horizons is more than 72 inches. The texture is fine to coarse sand. Reaction ranges from medium acid to moderately alkaline. Small, calcareous shell fragments are in some pedons. Few to many grains of black, dark brown, and white minerals are in some areas.

The A horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 3 to 7 and chroma of 0 to 3. It is 2 to 8 inches thick.

The upper part of the C horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 3 or 4. Low chroma colors associated with wetness occur as mottles or matrix colors within 15 to 40 inches of the surface. The thickness of the upper part of the C horizon is 12 to 35 inches.

Some pedons have an Ab horizon at a depth of 24 to 72 inches that has color similar to that of the A horizon. The Ab horizon contains few or common pieces of undecomposed plant material.

The lower part of the C horizon to a depth of 80 inches or more has hue of 10YR to 5Y or is neutral in hue. It has value of 4 to 7 and chroma of 0 to 2.

Croatan Series

The Croatan series consists of nearly level, very poorly drained, organic soils. These soils formed in highly decomposed organic material underlain by loamy marine and fluvial sediments. They are in drainageways. These soils are moderately slowly permeable. The water table is at or near the surface most of the year. Many areas are frequently flooded for brief periods. Slopes are 0 to 2 percent. The Croatan soils are loamy, siliceous, dysic, thermic Terric Medisaprists.

The Croatan soils are closely associated on the landscape with Ellabelle, Maurepas, Kingsland, Chaires, Goldhead, and Sapelo soils. Ellabelle, Chaires, Goldhead, and Sapelo soils are mineral soils. Ellabelle soils are in depressions. Chaires and Sapelo soils are on flatwoods. Goldhead soils are on broad, low flats and in depressions. Maurepas and Kingsland soils are in drainageways. The organic material in these soils is more than 52 inches thick.

Typical pedon of Croatan muck, frequently flooded; in a wooded area, 50 feet south of Florida State Highways 200 and A1A, 100 feet east of Boggy Creek, SE¼NW¼ sec. 7, T. 2 N., R. 26 E.

Oa1—0 to 10 inches; dark reddish brown (5YR 3/2) muck, broken faced and rubbed; 20 percent fiber, unrubbed, 10 percent fiber, rubbed; massive; very friable; many fine roots; about 10 percent mineral content; extremely acid; gradual wavy boundary.

Oa2—10 to 24 inches; black (10YR 2/1) muck, broken faced and rubbed; 10 percent fiber, unrubbed, 5 percent fiber, rubbed; massive; very friable; few fine roots; about 20 percent mineral content; extremely acid; gradual wavy boundary.

2Cg1—24 to 50 inches; olive gray (5Y 5/2) sandy clay loam; massive; friable; strongly acid; gradual wavy boundary.

2Cg2—50 to 65 inches; light olive gray (5Y 6/2) sandy clay loam; massive; friable; strongly acid.

The thickness of the organic material ranges from 16 to 51 inches. The organic material is extremely acid except where lime has been added. The underlying mineral horizons are extremely acid to slightly acid. Logs, stumps, and fragments of wood make up 0 to 10 percent of the organic layers.

The Oa1 horizon has hue of 10YR or 5YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. The Oa2 horizon has hue of 7.5YR or 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. The organic tiers contain 3 to 30 percent fiber, unrubbed, and less than 10 percent fiber, rubbed.

The underlying mineral layers are loamy and generally have hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2.

Echaw Series

The Echaw series consists of nearly level, moderately well drained, acid soils. These soils formed in thick beds of marine sand. They are on narrow to broad ridges that are adjacent to flatwoods. These soils are moderately rapidly permeable. Generally, the water table is at a depth of 30 to 60 inches for 6 to 9 months of the year and recedes to a depth of more than 60 inches during droughty periods. The water table is briefly at a depth of less than 42 inches during periods of heavy rainfall. Slopes are smooth or convex and are 0 to 2 percent. The Echaw soils are sandy, siliceous, thermic Entic Haplohumods.

The Echaw soils are closely associated on the landscape with Fripp, Kureb, Leon, Lynn Haven, Mandarin, Ridgewood, Resota, and Wesconnett soils. Fripp and Kureb soils are better drained than the Echaw soils. Fripp soils are on sand dunes. Kureb soils are on broad, upland ridges and on sand dunes. Leon and Mandarin soils have a spodic horizon within 30 inches of the surface and are on flatwoods. Leon, Lynn Haven, and Wesconnett soils are more poorly drained than the Echaw soils. Lynn Haven and Wesconnett soils are in depressions. Ridgewood and Resota soils do not have a spodic horizon. Resota soils are on elevated ridges.

Typical pedon of Echaw fine sand; in a wooded area in Fernandina Beach, 0.3 mile north of Florida State Highway 108 (Sadler Road), 0.3 mile east of Florida State Highway 105A (South 14th Street), sec. 29, T. 3 N., R. 28 E.

A—0 to 6 inches; very dark gray (10YR 3/1) fine sand; moderate medium granular structure; very friable; many fine and medium and few coarse roots; extremely acid; clear smooth boundary.

E1—6 to 20 inches; light gray (10YR 6/1) fine sand; single grained; loose; common fine and medium roots; very strongly acid; gradual wavy boundary.

E2—20 to 35 inches; light gray (10YR 7/1) fine sand; single grained; loose; common fine and many medium roots; very strongly acid; abrupt irregular boundary.

Bh—35 to 38 inches; dark brown (7.5YR 3/2) fine sand; massive; friable; few fine and common medium roots; sand grains coated with organic matter; few or common distinct light gray (10YR 7/2) vertical tongues, 0.5 inch to 2.0 inches wide, that have 0.5 to 1.0 inch dark reddish brown (5YR 2/2) exteriors; extremely acid; abrupt irregular boundary.

E′1—38 to 43 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; few fine roots; few or common prominent light gray (10YR 7/2) vertical tongues, 0.5 inch to 3.0 inches wide, that have dark brown (7.5YR 3/2 and 4/3) exteriors; very strongly acid; gradual irregular boundary.

E′2—43 to 54 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; few fine roots; few or common prominent light gray (10YR 7/2) vertical tongues, 0.5 inch to 3.0 inches wide, that have dark brown (7.5YR 3/2 and 4/3) exteriors; very strongly acid; gradual irregular boundary.

E′3—54 to 72 inches; light gray (10YR 7/2) fine sand; few fine distinct yellowish brown (10YR 5/6) and common medium distinct dark brown (10YR 4/3) mottles; few or common prominent light gray (10YR 7/2) vertical tongues, 0.5 inch to 2.0 inches wide, that have dark brown (7.5YR 3/2 and 4/3) exteriors; very strongly acid; gradual wavy boundary.

E′4—72 to 78 inches; brown (7.5YR 5/4) fine sand; common medium distinct dark brown (10YR 4/3) mottles; single grained; loose; few fine roots; very strongly acid; clear wavy boundary.

B′h—78 to 80 inches; dark reddish brown (5YR 3/2) fine sand; common medium faint black (5YR 2/1) fragments; massive; friable; few fine roots; sand grains coated with organic matter; very strongly acid.

Reaction ranges from extremely acid to strongly acid in the B′h horizon. Depth to the Bh horizon is 30 to 50 inches.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1. It is 2 to 7 inches thick.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2. It is 29 to 48 inches thick.

The Bh horizon has hue of 5YR, value of 2 or 3, and chroma of 1 to 4; hue of 7.5YR, value of 3, and chroma of 2; or hue of 10YR, value of 2 or 3, and chroma of 1 to 3. The sand grains are well coated with organic matter. This horizon is 3 to 34 inches thick.

The E′2 horizon has hue of 10YR, value of 4 to 7, and chroma of 1 to 4; hue of 7.5YR, value of 6, and chroma of 2 to 4; or hue of 7.5YR, value of 5, and chroma of 4. This horizon is 2 to 20 inches thick.

The B′h horizon to a depth of more than 80 inches has the same color range as the Bh horizon. The sand grains are coated with organic matter.

Some pedons do not have a bisequum of E′ and B′h horizons but have a C horizon. The E′ and B′h horizons have hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 to 3.

The Echaw soils in this county are taxadjuncts because they generally have chroma of 1 or 2 in the upper part of the E horizon and the clay plus silt in the control section is less than 10 percent. The low chroma is not indicative of wetness but rather of uncoated sand grains. These differences do not significantly affect the use and management of the soils.

Ellabelle Series

The Ellabelle series consists of nearly level, very poorly drained, acid soils. These soils formed in marine deposits of sandy and loamy sediments. They are in drainageways. These soils are moderately slowly permeable. Generally, the water table is at or above the surface for 6 to 9 months of the year. These soils are subject to flooding. Slopes are smooth or concave and are 0 to 2 percent. The Ellabelle soils are loamy, siliceous, thermic Arenic Umbric Paleaquults.

The Ellabelle soils are closely associated on the landscape with Blanton, Kingsferry, Chaires, Ocilla, Goldhead, Buccaneer, and Sapelo soils. All of the associated soils are better drained than the Ellabelle soils except Buccaneer soils. Blanton and Ocilla soils are on elevated ridges. Kingsferry, Chaires, and Sapelo soils have a spodic horizon and are on flatwoods. Goldhead soils are in sloughs and depressions. Buccaneer soils are in landscape positions similar to those of the Ellabelle soils. They have a mollic epipedon and a clayey argillic horizon that are within 20 inches of the surface.

Typical pedon of Ellabelle mucky fine sand, frequently flooded; in a wooded area, 0.15 mile southeast of road, 0.25 mile east of U.S. Highway 1, about 3.5 miles southeast of Callahan, NW¼NW¼ sec. 10, T. 2 N., R. 25 E.

A1—0 to 4 inches; black (10YR 2/1) mucky fine sand; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; gradual wavy boundary.

A2—4 to 12 inches; very dark gray (10YR 3/1) fine sand; common medium faint dark gray (10YR 4/1) streaks; weak fine granular structure; very friable; common fine roots; very strongly acid; gradual wavy boundary.

E1—12 to 17 inches; gray (10YR 5/1) fine sand; weak fine granular structure; very friable; few fine roots; very strongly acid; clear wavy boundary.

E2—17 to 36 inches; grayish brown (10YR 5/2) fine sand; common medium faint pale brown (10YR 6/3) mottles; light yellowish brown (10YR 6/4) and very dark gray (N 3/0) streaks at contact of Bt and E horizons; single grained; loose; very strongly acid; clear wavy boundary.

Btg1—36 to 47 inches; dark gray (10YR 4/1) sandy clay loam; fine coarse subangular blocky structure; friable; sand grains bridged and coated with clay; very strongly acid; gradual wavy boundary.

Btg2—47 to 60 inches; grayish brown (10YR 5/2) sandy clay; common medium distinct olive gray (5Y 5/2) and yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; sand grains bridged and coated with clay; very strongly acid; gradual wavy boundary.

Btg3—60 to 80 inches; greenish gray (5GY 5/1) sandy clay; massive; firm; sand grains bridged and coated with clay; very strongly acid.

The thickness of the solum ranges from 35 to 80 inches or more. Depth to the argillic horizon ranges from 20 to 40 inches. Reaction ranges from strongly acid to slightly acid.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is 10 to 22 inches thick.

The E horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is as much as 25 inches thick.

The Btg horizon has hue of 10YR or 5Y or is neutral in hue. It has value of 4 or 5 and chroma of 0 to 2. Mottles are in shades of yellow, brown, and gray. They range from common to many. The texture is fine sandy loam, sandy clay loam, or sandy clay. The content of clay in the upper 20 inches of this horizon ranges from 14 to 35 percent, and the content of silt is less than 15 percent. This horizon is 24 to 50 inches thick.

The C horizon to a depth of 80 inches or more has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 2 or less or hue of 5GY, value of 4 to 6, and chroma of 1. The texture is loamy fine sand.

The Ellabelle soils in this county are taxadjuncts because base saturation is more than 35 percent. This difference is outside of the defined range for the series but does not significantly affect the use and management of the soils.

Evergreen Series

The Evergreen series consists of nearly level, very poorly drained, acid soils. These soils formed in nonwoody, fibrous, hydrophytic plant remains underlain by sandy mineral sediment. They are in depressions and on flatwoods. These soils are moderately slowly permeable. Generally, the water table is at or above the surface for 6 to 9 months of the year. Slopes are smooth or concave and are 0 to 2 percent. The Evergreen soils are sandy, siliceous, thermic Typic Haplaquods.

The Evergreen soils are closely associated with Boulogne, Maurepas, Hurricane, Kingsferry, Leon, and Rutlege soils. All of the associated soils except Maurepas soils are of mineral origin. Boulogne, Kingsferry, and Leon soils are on flatwoods. Maurepas soils have an organic layer more than 51 inches thick. They are in landscape positions similar to those of the Evergreen soils. Hurricane soils are on slightly elevated ridges. Rutlege soils are in swamp hardwoods in drainageways.

Typical pedon of Evergreen muck, in an area of Evergreen-Leon mucks, depressional; in a wooded area, approximately 6 miles west of Fernandina Beach, 200 yards east of Rayonier Road 34A, about 1.1 miles north of Florida State Highway 200A, 0.7 mile west of Old Chester Road, Land Grant 51, T. 3 N., R. 27 E.

Oa—0 to 11 inches; black (10YR 2/1) muck; 30 percent fiber, unrubbed, 5 percent fiber, rubbed; massive; very friable; common fine and medium and few coarse roots; extremely acid; gradual wavy boundary.

2A1—11 to 14 inches; black (10YR 2/1) loamy fine sand; massive; very friable; common fine and medium and few coarse roots; extremely acid; clear wavy boundary.

2A2—14 to 17 inches; very dark gray (10YR 3/1) fine sand; single grained; loose; common medium and few fine and coarse roots; extremely acid; gradual wavy boundary.

2E—17 to 26 inches; light brownish gray (10YR 6/2) fine sand; common medium distinct dark gray (10YR 4/1) mottles; single grained; loose; few fine and medium roots; very strongly acid; clear wavy boundary.

2Bh1—26 to 54 inches; dark reddish brown (5YR 2/2 and 3/2) loamy fine sand; many coarse faint dark reddish brown (5YR 3/2) fragments; massive; friable; few fine roots; sand grains coated with organic matter; very strongly acid; clear wavy boundary.

2Bh2—54 to 80 inches; dark reddish brown (5YR 3/2) fine sand; massive; very friable; sand grains coated with organic matter; very strongly acid.

The Oa horizon has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 or 2 or is neutral in hue and has value of 2 or 3. It contains 10 to 33 percent fiber, unrubbed, and less than 10 percent fiber, rubbed. This horizon is coarse granular or massive. It is 6 to 14 inches thick.

The 2A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2 or is neutral in hue and has value of 2 or 3. It is a mixture of uncoated sand grains and organic matter. This horizon is 2 to 8 inches thick. The texture is loamy fine sand, fine sand, or sand.

The 2E horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. It is 2 to 20 inches thick. The texture is sand or fine sand.

The 2Bh horizon to a depth of 80 inches or more has hue of 10YR, value of 3 or 4, and chroma of 1 to 3 or hue of 5YR and value of 2 or 3. Sand grains are coated with organic matter. The number of small, black or dark reddish brown, weakly cemented fragments ranges from none to many in the Bh horizon. The texture is fine sand or loamy fine sand.

Fripp Series

The Fripp series consists of gently rolling to hilly, excessively drained soils. These soils formed from marine sand reworked by wind and wave action. They are on narrow dunelike ridges along the Atlantic coast. These soils are rapidly permeable. The water table is at a depth of more than 72 inches. Slopes range from 5 to 20 percent. The Fripp soils are thermic, uncoated Typic Quartzipsamments.

The Fripp soils are closely associated on the landscape with Corolla, Echaw, Kureb, Mandarin, Newhan, and Resota soils. Corolla soils are on lower elevated dunes than the Fripp soils and are more poorly drained. Echaw and Mandarin soils are on flatwoods, have a spodic horizon, and are more poorly drained than the Fripp soils. Kureb and Resota soils are on sandy ridges and have an E horizon. Newhan soils are on dunes, are affected by salt spray, and have no trees on the landscape.

Typical pedon of Fripp fine sand, rolling; in a wooded area, approximately 7 miles south of Fernandina Beach, 0.4 mile west of Florida State Highway A1A, and 100 feet south of Burney Blvd., sec. 20, T. 2 N., R. 28 E.

A—0 to 4 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; common fine roots; slightly acid; clear wavy boundary.

C—4 to 80 inches; very pale brown (10YR 7/4) fine sand; common medium faint light gray (10YR 7/2) splotches; few fine horizontal gray (10YR 5/1) streaks; single grained; loose; neutral.

The content of silt plus clay in the 10- to 40-inch control section is less than 5 percent. Reaction ranges from extremely acid to mildly alkaline. Few to many fine dark minerals and few shell fragments are in some pedons.

The A horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It is 1 to 8 inches thick.

The C horizon to a depth of 80 inches or more has hue of 10YR, value of 6 or 7, and chroma of 2 to 4 and has splotches or streaks of light gray or gray.

Goldhead Series

The Goldhead series consists of nearly level and gently sloping, poorly drained and very poorly drained soils. These soils formed in marine deposits of sandy and loamy sediments. They are on broad, low flats and side slopes, in sloughs, and in depressions. These soils are moderately slowly permeable. Generally, the water table is at a depth of less than 12 inches for 3 to 6 months of the year and at a depth of 12 to 30 inches for 6 to 9 months; in depressions, however, the water table is at or above the surface for 6 to 9 months. Slopes are smooth or convex and range from 0 to 5 percent. The Goldhead soils are loamy, siliceous, thermic Arenic Ochraqualfs.

The Goldhead soils are closely associated on the landscape with Croatan, Ellabelle, Chaires, Ocilla, Meadowbrook, Meggett, and Sapelo soils. Croatan and Ellabelle soils are very poorly drained. Croatan soils are in depressions. Ellabelle soils are on flood plains. Chaires and Sapelo soils have a spodic horizon and are on flatwoods. Ocilla soils are somewhat poorly drained and are on slightly elevated ridges. Meadowbrook and Meggett soils are in landscape positions similar to those of the Goldhead soils. Meadowbrook soils have an argillic horizon below a depth of 40 inches.

Typical pedon of Goldhead fine sand; in a wooded area, 6.5 miles northeast of Callahan, 0.8 mile north of Florida State Highways A1A and 200, about 2.5 miles east of Griffin Road, under a power line, NE¼SW¼ sec. 6, T. 2 N., R. 26 E.

A—0 to 8 inches; black (10YR 2/1) fine sand; moderate medium granular structure; friable; many fine and common medium roots; extremely acid; abrupt smooth boundary.

E1—8 to 16 inches; dark gray (10YR 4/1) fine sand; common medium faint very dark gray (10YR 3/1) streaks; single grained; loose; common fine roots; very strongly acid; common wavy boundary.

E2—16 to 33 inches; gray (10YR 5/1) fine sand; single grained; loose; few fine roots; very strongly acid; abrupt irregular boundary.

Btg—33 to 69 inches; olive gray (5Y 5/2) sandy clay loam; common medium distinct strong brown (7.5YR 5/8), few fine distinct dark grayish brown (10YR 4/2), and few fine prominent red (2.5YR 4/6) mottles; few vertical channels of dark grayish brown (10YR 4/2) fine sand, 1 to 2 inches in diameter and 5 to 15 inches long; weak coarse subangular blocky structure; firm; few fine roots; sand grains bridged and coated with clay; very strongly acid; clear wavy boundary.

C—69 to 80 inches; greenish gray (5GY 6/1) loamy fine sand; common medium distinct dark gray (10YR 4/1) and few medium distinct strong brown (7.5YR 5/8) mottles; single grained; loose; very strongly acid.

The solum is more than 60 inches thick. Reaction is extremely acid or very strongly acid except where lime has been added. The underlying argillic horizon is at a depth of 20 to 40 inches.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1. It is 4 to 9 inches thick.

The E horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 5 to 7 and chroma of 0 to 2. It is 18 to 34 inches thick.

Some pedons have a very dark gray (10YR 3/1) or dark gray (10YR 4/1) transitional horizon, 0.5 inch to 3.0 inches thick, between the E and Btg horizons.

The Btg horizon has hue of 10YR, 2.5Y, 5Y, or 5GY or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. The number of fine or medium, brown, yellow, or red mottles ranges from none to many throughout the horizon. The texture is fine sandy loam or sandy clay loam. The clay content ranges from 15 to 35 percent in the upper 20 inches of this horizon, but the texture can range to sandy clay in the lower part.

The C horizon has hue of 5Y or 5GY, value of 5 to 7, and chroma of 1. The texture is loamy fine sand or loamy sand.

Hurricane Series

The Hurricane series consists of nearly level and gently sloping, somewhat poorly drained soils. These soils formed in thick deposits of marine sand. They are on narrow to broad ridges and isolated knolls interspersed with flatwoods. These soils are moderately rapidly permeable. Generally, the water table is at a depth of 24 to 42 inches for 2 to 6 months of the year. It rises, however, to a depth of 12 to 24 inches for brief periods of less than 1 month during periods of heavy rainfall and then recedes to a depth of 24 inches or more. It is below a depth of 42 inches for the rest of the year. Slopes are smooth or convex and range from 0 to 5 percent. The Hurricane soils are sandy, siliceous, thermic Grossarenic Entic Haplohumods.

The Hurricane soils are closely associated on the landscape with Boulogne, Centenary, Leon, Evergreen, Mandarin, Ortega, Ridgewood, and Pottsburg soils. Boulogne and Pottsburg soils are more poorly drained and are on flatwoods. Centenary and Ortega soils are moderately well drained and are on higher ridges than the Hurricane soils. Ortega soils do not have a spodic horizon. Leon soils are poorly drained, are on flatwoods, and have a spodic horizon within 30 inches of the surface. They are in depressions. Mandarin soils have a spodic horizon within 30 inches of the surface and are on slightly elevated flatwoods. Ridgewood soils do not have a spodic horizon and are in landscape positions similar to those of the Hurricane soils.

Typical pedon of Hurricane fine sand, in an area of Hurricane-Pottsburg fine sands, 0 to 5 percent slopes; in a wooded area, approximately 2 miles south of Yulee, 50 feet south of Radio Avenue, 0.55 mile east of U.S. Highway 17, Land Grant 42, T. 2 N., R. 27 E.

Ap—0 to 5 inches; grayish brown (10YR 5/2) fine sand; common medium distinct pale brown (10YR 6/3) bodies; weak fine granular structure; very friable; many fine and common medium roots; extremely acid; clear smooth boundary.

E1—5 to 10 inches; yellowish brown (10YR 5/4) fine sand; few fine faint yellowish brown (10YR 5/8) and common medium distinct light brownish gray (10YR 6/2) uncoated sand grains; few fine distinct black (10YR 2/1) organic matter specks; single grained; loose; many fine and common medium roots; very strongly acid; gradual wavy boundary.

E2—10 to 20 inches; light yellowish brown (10YR 6/4) fine sand; few fine faint yellowish brown (10YR 5/6) mottles; few fine distinct black (10YR 2/1) organic matter specks; single grained; loose; common fine and few medium roots; very strongly acid; gradual wavy boundary.

E3—20 to 39 inches; light gray (10YR 7/2) fine sand; common medium faint pale brown (10YR 6/3) and light brownish gray (10YR 6/2) mottles; single grained; loose; extremely acid; gradual wavy boundary.

E4—39 to 68 inches; light gray (10YR 7/1) fine sand; single grained; loose; common uncoated sand grains; very strongly acid; gradual wavy boundary.

Bh1—68 to 77 inches; dark brown (7.5YR 3/2) fine sand; single grained; loose; common uncoated sand grains; extremely acid; gradual wavy boundary.

Bh2—77 to 80 inches; dark reddish brown (5YR 2/2) fine sand; massive; very friable; sand grains well coated with organic matter; extremely acid.

The solum is 80 inches or more thick. Depth to the spodic horizon is 51 to 80 inches. Depth to the E horizon is 5 to 40 inches. Reaction ranges from medium acid to extremely acid.

The A horizon has hue of 10YR, value of 3 to 6, and chroma of 1 to 3. It is 2 to 9 inches thick.

The E horizon has hue of 10YR, value of 4 to 8, and chroma of 1 to 4. Mottles that have chroma of 2 or 3 may occur below a depth of 20 inches. This horizon is 35 to 70 inches thick.

The Bh horizon to a depth of 80 inches or more has hue of 10YR, 7.5YR, or 5YR, value of 2 to 5, and chroma of 4 or less. The texture is fine sand or loamy fine sand. Sand grains in this horizon are well coated with organic matter in the lower part of the Bh horizon.

Kershaw Series

The Kershaw series consists of gently sloping and sloping, excessively drained, acid soils. These soils formed in thick deposits of marine sand. They are on broad ridges and on isolated knolls. These soils are very rapidly permeable. The water table is at a depth of more than 72 inches. Slopes are smooth or convex and range from 2 to 8 percent. The Kershaw soils are thermic, uncoated Typic Quartzipsamments.

The Kershaw soils are closely associated on the landscape with Fripp, Kureb, and Ortega soils. Fripp soils are on dunes. Kureb soils have an E horizon and are on broad ridges and isolated knolls. Ortega soils are moderately well drained and are on lower ridges than the Kershaw soils.

Typical pedon of Kershaw fine sand, 2 to 8 percent slopes; in a wooded area, 5.5 miles north of Yulee, 0.4 mile east of Rayonier Road 49, about 50 feet southwest of Rayonier Road 6, Land Grant 45, T. 3 N., R. 27 E.

A—0 to 7 inches; very dark grayish brown (10YR 3/2) fine sand; weak medium granular structure; very friable; many fine, common medium, and few coarse roots; very strongly acid; clear wavy boundary.

C1—7 to 30 inches; yellowish brown (10YR 5/4) fine sand; many fine distinct black (10YR 2/1) organic matter specks; single grained; loose; few fine and medium roots; very strongly acid; gradual wavy boundary.

C2—30 to 58 inches; yellowish brown (10YR 5/6) fine sand; common fine distinct black (10YR 2/1) organic matter specks; few fine distinct pale brown (10YR 6/3) uncoated sand grains; very strongly acid; gradual wavy boundary.

C3—58 to 80 inches; yellow (10YR 7/6) fine sand; common medium distinct pale brown (10YR 6/3) uncoated sand grains; single grained; loose; very strongly acid.

Reaction ranges from medium acid to very strongly acid. The 10- to 40-inch control section contains less than 5 percent silt plus clay.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. It is 2 to 7 inches thick.

The C horizon to a depth of 80 inches or more has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 6. In a few pedons, mottles in shades of white, yellow, and brown are below a depth of 40 inches. Mottling does not indicate restricted drainage. Black organic matter specks are in some pedons.

Kingsferry Series

The Kingsferry series consists of nearly level, very poorly drained soils. These soils formed in thick deposits of sandy marine sediment. They are on broad, low flats. These soils are moderately slowly permeable. Generally, the water table is within 6 inches of the surface for 2 to 6 months of the year. Slopes are smooth or concave and are 0 to 2 percent. The Kingsferry soils are sandy, siliceous, thermic Arenic Haplaquods.

The Kingsferry soils are closely associated on the landscape with Boulogne, Croatan, Hurricane, Leon, Lynn Haven, and Wesconnett soils. Boulogne soils are poorly drained and are on flatwoods. Croatan soils are organic and are in swamp hardwoods in drainageways. Hurricane and Leon soils have an E horizon, are better drained than the Kingsferry soils, and are on flatwoods. Lynn Haven and Wesconnett soils are in shallow depressions.

Typical pedon of Kingsferry fine sand; in a wooded area, 5.5 miles northwest of Callahan, 1.6 miles west of Nassau County Road 115, about 0.1 mile north of logging road, 50 feet east of trail, NW¼NW¼NW¼ sec. 10, T. 2 N., R. 24 E.

A1—0 to 11 inches; black (10YR 2/1) fine sand; moderate medium granular structure; friable; many fine, common medium, and few coarse roots; extremely acid; clear wavy boundary.

A2—11 to 17 inches; very dark gray (10YR 3/1) fine sand; single grained; loose; common fine roots; sand grains very thinly coated with organic matter; very strongly acid; gradual wavy boundary.

A3—17 to 34 inches; dark gray (10YR 4/1) fine sand; common medium faint very dark gray (10YR 3/1) and few fine faint gray (10YR 5/1) streaks; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

Bh1—34 to 43 inches; very dark gray (5YR 3/1) fine sand; massive; very friable; sand grains coated with organic matter; very strongly acid; gradual wavy boundary.

Bh2—43 to 67 inches; dark reddish brown (5YR 2/2) fine sand; common medium distinct black (5YR 2/1) fragments; massive; friable; sand grains coated with organic matter; very strongly acid; gradual wavy boundary.

Bh3—67 to 80 inches; black (5YR 2/1) fine sand; massive; very firm, weakly cemented; sand grains coated with organic matter; very strongly acid.

The solum is more than 80 inches thick. Reaction is strongly acid to extremely acid. Depth to the spodic horizon is 30 to 50 inches. The texture is fine sand except in the Bh horizon, which is fine sand and loamy fine sand.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or is neutral in hue and has value of 2. It is 30 to 47 inches thick.

Some pedons have an E horizon that has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is as much as 17 inches thick.

The Bh horizon has hue of 5YR, 7.5YR, or 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. The lower part of the Bh horizon is weakly cemented in more than half of the horizon in each pedon. It is very friable or friable in the upper part and firm or very firm in the lower part. Depth to the firm and very firm, weakly cemented Bh horizon is more than 60 inches.

Some pedons have a bisequum of Bh, E′, and B′h horizons.

Some pedons have a B′h horizon that has hue of 7.5YR or 5YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. It is as much as 16 inches thick. Depth to this horizon generally is 30 to 50 inches.

Some pedons have a C horizon to a depth of 80 inches or more that has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. The texture is dominantly fine sand. Lenses of loamy material are at a depth of 50 to 70 inches in some pedons.

Kingsland Series

The Kingsland series consists of deep, nearly level, very poorly drained, organic soils. These soils formed in thick deposits of woody hydrophytic plant remains. They are on flood plains along the tributaries and major streams that are influenced by tidal action. These soils are rapidly permeable. Generally, the water table is at or above the surface during most of the year. Slope is 0 to 2 percent. The Kingsland soils are euic, thermic Typic Medihemists.

The Kingsland soils are closely associated on the landscape with Maurepas and Tisonia soils. Maurepas soils are in swamp hardwoods. Tisonia soils are flooded daily by tides, are underlain by clay, and are in salt marshes.

Typical pedon of Kingsland mucky peat, frequently flooded; in a wooded area, 0.1 mile east of Interstate 95 at weigh station, SW¼NE¼ sec. 27, T. 4 N., R. 26 E.

Oe1—0 to 12 inches; black (10YR 2/1) mucky peat; 55 percent fiber, unrubbed, 35 percent fiber, rubbed; massive; friable; many fine roots; neutral (pH of 6.5 in calcium chloride); gradual wavy boundary.

Oe2—12 to 30 inches; black (10YR 2/1) mucky peat; 45 percent fiber, unrubbed, 25 percent fiber, rubbed; massive; friable; common fine roots; mildly alkaline (pH of 6.5 in calcium chloride); gradual wavy boundary.

Oe3—30 to 80 inches; black (10YR 2/1) mucky peat; 35 percent fiber, unrubbed, 25 percent fiber, rubbed; massive; very friable; about 5 to 10 percent mineral material; moderately alkaline (pH of 6.5 in calcium chloride).

The organic material is more than 51 inches thick. In all horizons the pH is 4.5 to 6.5 in 0.01 molar calcium chloride. The reaction in water is medium acid to moderately alkaline.

The surface tier has hue of 5YR to 10YR or is neutral in hue. It has value of 1 or 2 and chroma of 0 to 2. It dominantly contains hemic material but includes some sapric material. It is 6 to 20 inches thick.

Some pedons have a subsurface tier, which has hue of 5YR to 10YR or is neutral in hue and has value of 1 to 3 and chroma of 0 to 2. The color normally does not change in value or in chroma after rubbing. The fiber content of the Oe2 horizon and upper part of the Oe3 horizon is more than 33 percent unrubbed and 20 to 45 percent rubbed. The thickness of this subsurface tier ranges from 8 to 20 inches.

The bottom tier to a depth of 51 inches or more has hue of 10YR, value of 1 to 3, and chroma of 1 or 2.

Kureb Series

The Kureb series consists of nearly level to hilly, excessively drained soils. These soils formed in thick beds of marine, fluvial, or eolian sand. They are on broad upland ridges and on narrow dunelike ridges along the Atlantic coast. These soils are rapidly permeable. The water table is at a depth of more than 72 inches. Slopes are convex and range from 0 to 20 percent. The Kureb soils are thermic, uncoated Spodic Quartzipsamments.

The Kureb soils are closely associated on the landscape with Echaw, Fripp, Kershaw, Mandarin, Ortega, Resota, and Ridgewood soils. Echaw and Mandarin soils have a spodic horizon, are on flatwoods, and are more poorly drained than the Kureb soils. Fripp, Kershaw, Ortega, and Ridgewood soils do not have an E horizon. Fripp soils are on sand dunes. Kershaw soils are on upland sandhills. Ortega soils are moderately well drained. Ridgewood soils are somewhat poorly drained. Resota soils are moderately well drained. Ridgewood and Resota soils are on lower elevated ridges than the Kureb soils.

Typical pedon of Kureb fine sand, 0 to 5 percent slopes; in a wooded area in Fernandina Beach, 0.45 mile south of Lime Street, 0.05 mile east of Will Hardee Road, at end of Thrasher Drive, SW¼ sec. 27, T. 3 N., R. 28 E.

A—0 to 5 inches; gray (10YR 5/1) fine sand; single grained; loose; organic matter and quartz grains have a salt-and-pepper appearance; many fine, common medium, and few coarse roots; extremely acid; clear smooth boundary.

E—5 to 19 inches; light brownish gray (10YR 6/2) fine sand; common medium faint light gray (10YR 7/1) streaks; single grained; loose; common fine and few medium roots; extremely acid; abrupt irregular boundary.

C/Bh—19 to 30 inches; strong brown (7.5YR 4/6) fine sand; few light gray (10YR 7/2) vertical channels, 1 to 2 inches in width and 1 to 9 inches in length, extend from the horizon above; dark brown (7.5YR 3/2) and few dark reddish brown (5YR 3/2) thin bands and bodies; intermittent bands at horizon contact and vertical bands along walls of vertical channels; single grained; loose; common fine and few medium roots; extremely acid; gradual wavy boundary.

C1—30 to 42 inches; yellowish brown (10YR 5/8) fine sand; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

C2—42 to 55 inches; brownish yellow (10YR 6/6) fine sand; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

C3—55 to 60 inches; yellow (10YR 7/6) fine sand; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

C4—60 to 65 inches; very pale brown (10YR 7/4) fine sand; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

C5—65 to 80 inches; very pale brown (10YR 7/3) fine sand; single grained; loose; few fine roots; very strongly acid.

The sandy horizons are more than 80 inches thick. Reaction ranges from extremely acid to slightly acid. The content of silt plus clay in the 10- to 40-inch control section is less than 5 percent.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1. It is 1 to 5 inches thick.

The E horizon has hue of 10YR, value of 6 to 8, and chroma of 1 or 2. It is 5 to 25 inches thick.

The C part of the C/Bh horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. Most pedons have tongues of Bh horizon material 0.5 inch to 3.0 inches in diameter. A thin, discontinuous, very dark grayish brown or dark reddish brown layer is between the E horizon and C horizon in some places. Dark reddish brown or very dark grayish brown spodic fragments are in some pedons.

Some pedons have a Bw horizon. The thickness of the Bw and E horizons ranges from 4 to 15 inches.

The C horizon to a depth of 80 inches or more has hue of 10YR, value of 5 to 8, and chroma of 1 to 8.

Leefield Series

The Leefield series consists of nearly level and gently sloping, somewhat poorly drained, acid soils. These soils formed in thick deposits of sandy and loamy materials. They are on narrow to broad ridges and on isolated knolls. These soils are moderately slowly permeable. Generally, the water table is at a depth of 18 to 30 inches for 2 to 4 months of the year and at a depth of 30 to 50 inches for 3 to 6 months or more. Slopes range from 0 to 5 percent. The Leefield soils are loamy, siliceous, thermic Arenic Plinthaquic Paleudults.

The Leefield soils are closely associated on the landscape with Albany, Blanton, Ellabelle, Chaires, Goldhead, Meadowbrook, and Sapelo soils. Albany and Blanton soils have an argillic horizon below a depth of 40 inches. Albany soils are in landscape positions similar to those of the Leefield soils. Blanton soils are moderately well drained and are in the higher landscape positions. Ellabelle soils are very poorly drained and are on broad, low flats. Chaires and Sapelo soils have a spodic horizon, are poorly drained, and are on flatwoods. Goldhead and Meadowbrook soils are more poorly drained than the Leefield soils and are on broad, low flats.

Typical pedon of Leefield fine sand, 0 to 5 percent slopes; in a wooded area, 6 miles west of Hilliard, 100 yards south of Nassau County Road 115, NE¼NW¼ sec. 9, T. 3 N., R. 23 E.

A—0 to 5 inches; gray (10YR 5/1) fine sand; weak fine granular structure; very friable; many fine and few medium and coarse roots; very strongly acid; clear smooth boundary.

E1—5 to 14 inches; light yellowish brown (2.5Y 6/4) fine sand; few fine distinct light gray (10YR 7/2) mottles; single grained; loose; few fine and medium roots; strongly acid; gradual wavy boundary.

E2—14 to 23 inches; pale yellow (2.5Y 7/4) fine sand; common medium distinct light gray (10YR 7/2) mottles; single grained; loose; few fine roots; very strongly acid; clear wavy boundary.

E/B—23 to 29 inches; brownish yellow (10YR 6/6) loamy fine sand; few fine distinct light gray (10YR 7/2), strong brown (7.5YR 5/8), and red (2.5YR 4/6) mottles; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

Btv—29 to 33 inches; light yellowish brown (2.5Y 6/4) fine sandy loam; few fine distinct light gray (10YR 7/2), common medium distinct yellowish brown (10YR 5/8), and few fine prominent red (2.5YR 4/8) mottles; weak medium subangular blocky structure; friable; few fine roots; sand grains coated and bridged with clay; 8 percent plinthite; strongly acid; gradual wavy boundary.

Btg1—33 to 44 inches; light gray (10YR 7/1) sandy clay loam; common medium distinct strong brown (7.5YR 5/8) and red (2.5YR 4/6) mottles; weak medium subangular blocky structure; firm; few fine roots; sand grains coated and bridged with clay; 3 percent plinthite; very strongly acid; gradual wavy boundary.

Btg2—44 to 80 inches; light gray (10YR 7/1) sandy clay loam; few medium prominent dark red (2.5YR 3/6), common medium prominent red (2.5YR 4/6), and common medium distinct strong brown (7.5YR 5/8) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; sand grains coated and bridged with clay; very strongly acid.

The thickness of the solum ranges from 60 to 80 inches or more. Depth to horizons that contain 5 to 20 percent plinthite ranges from 29 to 60 inches. Reaction is strongly acid or very strongly acid except where lime has been added to the A horizon.

The A horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 3 to 5 and chroma of 0 to 2. It is 4 to 9 inches thick.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 6. Mottles in this horizon are gray, brown, and yellow. The number of mottles ranges from none to common. This horizon is 18 to 34 inches thick.

The E/B horizon has hue of 10YR, value of 6 or 7, and chroma of 4 to 6. Few or common mottles are light gray or in shades of brown or yellow.

The Bt horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 to 6. Few or common mottles are gray, brown, and red. The content of plinthite is 5 to 10 percent. The texture is fine sandy loam or sandy clay loam. This horizon is as much as 5 inches thick.

The Btg horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 5 or 6 and chroma of 0 to 2. Few or common mottles are brown and red. The lower part of the Btg horizon generally is reticulately mottled with gray, brown, yellow, and red. The content of plinthite in this horizon is less than 5 percent. The texture is fine sand or sandy clay loam. The upper 20 inches of this horizon ranges from 15 to 25 percent clay.

Leon Series

The Leon series consists of nearly level, poorly drained and very poorly drained soils. These soils formed in thick beds of marine sand. They are on broad flatwoods, in depressions, and in tidal marshes. These soils are moderately permeable or moderately rapidly permeable. In depressions the water table is above the surface for 6 to 9 months of the year. On flatwoods it is at a depth of 6 to 18 inches for 1 to 4 months of the year during periods of heavy rainfall and at a depth of 12 to 42 inches for 2 to 8 months or more. In tidal areas it is at or above the surface throughout the year. Slopes are smooth or convex and are 0 to 2 percent. The Leon soils are sandy, siliceous, thermic Aeric Haplaquods.

The Leon soils are closely associated on the landscape with Boulogne, Echaw, Evergreen, Hurricane, Leon, Lynn Haven, Mandarin, Kingsferry, Ridgewood, Pottsburg, Rutlege, Sapelo, and Wesconnett soils. Boulogne, Pottsburg, and Sapelo soils are on flatwoods. Boulogne soils do not have an E horizon. Pottsburg soils have a spodic horizon below a depth of 50 inches. Sapelo soils have an argillic horizon below a depth of 40 inches. Echaw, Hurricane, Mandarin, and Ridgewood soils are better drained than the Leon soils and are on slightly elevated ridges on flatwoods. Evergreen, Leon, Lynn Haven, Kingsferry, Rutlege, and Wesconnett soils are more poorly drained than the Leon soils. Evergreen, Leon, Lynn Haven, and Wesconnett soils are in depressions. Kingsferry soils are on broad, low flats. Rutlege soils are in swamp hardwoods in drainageways.

Typical pedon of Leon fine sand; in a wooded area, 5 miles northwest of Callahan, 3.7 miles west of Nassau County Road 115, about 0.4 mile east of a logging road, 0.1 mile south of the logging road, 50 feet south of trail, NE¼NE¼NW¼ sec. 16, T. 2 W., R. 24 E.

A—0 to 7 inches; very dark gray (10YR 3/1) fine sand; moderate medium granular structure; very friable; many fine, common medium, and few coarse roots; extremely acid; clear smooth boundary.

E—7 to 18 inches; gray (10YR 5/1) fine sand; common medium faint dark gray (10YR 4/1) streaks; single grained; loose; common fine and few medium roots; extremely acid; abrupt smooth boundary.

Bh1—18 to 21 inches; black (5YR 2/1) fine sand; few gray (10YR 6/1) tongues in old root channels; massive; firm; few fine and common medium roots; sand grains coated with organic matter; extremely acid; gradual wavy boundary.

Bh2—21 to 31 inches; dark reddish brown (5YR 3/4) fine sand; gray (10YR 6/1) tongues in old root channels with black (5YR 2/1) exteriors; massive; very friable; few medium and few fine roots; extremely acid; clear wavy boundary.

E′—31 to 37 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; extremely acid; clear smooth boundary.

B′h1—37 to 44 inches; dark brown (7.5YR 3/2) fine sand; massive; very friable; sand grains coated with organic matter; very strongly acid; gradual wavy boundary.

B′h2—44 to 80 inches; black (5YR 2/1) fine sand; massive; friable; sand grains coated with organic matter; very strongly acid.

Reaction ranges from extremely acid to slightly acid except where lime has been added. In tidal areas reaction is very strongly acid to moderately alkaline. Depth to the Bh horizon is less than 30 inches.

Some pedons have an Oa horizon that has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 0 to 2 or is neutral in hue and has value of 2 or 3. The fiber content is 10 to 33 percent unrubbed and less than 10 percent rubbed. This horizon is coarse granular or is structureless. It is as much as 8 inches thick.

The A horizon is neutral and has value of 2 to 4 or has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. When dry, it has a salt-and-pepper appearance because of the dark colored organic matter and the white sand grains. This horizon is 2 to 26 inches thick. If value is 3.5 or less, it is less than 8 inches thick; but in tidal areas it is as much as 30 inches thick.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 or 2. It is 4 to 22 inches thick. In some pedons a black (10YR 2/1) to dark gray (10YR 4/1) transitional horizon, 0.5 inch to 2.0 inches thick, is between the E horizon and the Bh horizon.

The Bh horizon has hue of 5YR, 7.5YR, or 10YR, value of 2 or 3, and chroma of 1 to 4. In some pedons 15 to 25 percent of the Bh horizon is weakly cemented in more than half the horizon in each pedon. This horizon is 6 to 35 inches thick.

Some pedons have a BE horizon that has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 3 or 4. This horizon can have mottles of gray, brown, and yellow. It is as much as 5 inches thick.

The E′ horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 1 to 4. It is as much as 36 inches thick.

The B′h horizon to a depth of more than 80 inches is similar to the Bh horizon and is below the E′ horizon. Some pedons do not have a B′h horizon.

Some pedons do not have a bisequum of E′ and B′h but have a C horizon that has hue of 7.5YR or 10YR, value of 4 to 8, and chroma of 1 to 4. In tidal areas the C horizon contains shell fragments.

Lynn Haven Series

The Lynn Haven series consists of nearly level, very poorly drained soils. These soils formed in thick beds of sandy marine sediment. They are in depressions on flatwoods. These soils are moderately permeable or moderately rapidly permeable. Generally, the soil is ponded and the water table is at or above the surface for 6 to 9 months of the year. Slopes are smooth or convex and are 0 to 2 percent. The Lynn Haven soils are sandy, siliceous, thermic Typic Haplaquods.

The Lynn Haven soils are associated on the landscape with Evergreen, Hurricane, Kingsferry, Leon, and Wesconnett soils. Evergreen soils are organic and are in depressions. Hurricane soils have a spodic horizon below a depth of 30 inches. Kingsferry and Leon soils are on flatwoods. Kingsferry soils do not have an E horizon. Leon soils do not have an umbric epipedon. Wesconnett soils do not have an E horizon and are in depressions.

Typical pedon of Lynn Haven fine sand, in an area of Lynn Haven-Wesconnett-Leon complex, depressional; 50 feet west of Rayonier Road 1, about 0.5 mile east of U.S. Highway 17, about 0.65 mile south of Florida State Highways 200 and A1A, 0.65 mile south of O'Neil, NW¼SE¼SW¼ sec. 27, T. 2 N., R. 28 E.

A1—0 to 9 inches; black (10YR 2/1) fine sand; weak medium granular structure; very friable; many fine and common medium roots; strongly acid; clear wavy boundary.

E1—9 to 16 inches; gray (10YR 5/1) fine sand; single grained; loose; strongly acid; gradual wavy boundary.

E2—16 to 25 inches; light gray (10YR 6/1) fine sand; single grained; loose; strongly acid; clear wavy boundary.

Bh1—25 to 42 inches; black (10YR 2/1) fine sand; massive; very friable; sand grains well coated with organic matter; strongly acid; gradual wavy boundary.

Bh2—42 to 80 inches; dark reddish brown (5YR 2/2) fine sand; massive; friable; sand grains well coated with organic matter; strongly acid.

Reaction ranges from extremely acid to strongly acid.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is 8 to 15 inches thick.

The E horizon has hue of 10YR, value of 4 to 6, and chroma of 1. It is 2 to 16 inches thick.

The Bh horizon has hue of 10YR, value of 2, and chroma of 1 or 2; hue of 7.5YR, value of 3, and chroma of 2; or hue of 5YR and value and chroma of 2 or 3. Sand grains are coated with organic matter. This horizon is 6 to more than 50 inches thick.

Some pedons have a CB horizon that has hue of 10YR, value of 2 to 5, and chroma of 3 or 4 or hue of 7.5YR and value and chroma of 4. This horizon is as much as 10 inches thick.

Some pedons have a C horizon to a depth of 80 inches or more that has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or has mottles in shades of brown, yellow, and red.

Mandarin Series

The Mandarin series consists of nearly level, somewhat poorly drained, acid soils. These soils formed in thick beds of marine sand. They are on narrow to broad ridges adjacent to flatwoods and on low terraces along the St. Marys River. These soils are moderately permeable. Generally, the water table is at a depth of 18 to 42 inches for 4 to 6 months of the year. It is at a depth of 12 to 18 inches for as long as 2 weeks during periods of heavy rainfall. On terraces along the St. Marys River, these soils are subject to occasional flooding. Slopes are smooth or convex and are 0 to 2 percent. The Mandarin soils are sandy, siliceous, thermic Typic Haplohumods.

The Mandarin soils are closely associated on the landscape with Echaw, Evergreen, Hurricane, Leon, Lynn Haven, Kingsferry, Ousley, Osier, Resota, Ridgewood, Rutlege, and Wesconnett soils. Echaw soils are in higher positions than the Mandarin soils. They are on flatwoods. Evergreen soils are organic and are in depressions. Hurricane soils have a spodic horizon below a depth of 50 inches and are on slightly elevated ridges on flatwoods. Leon and Kingsferry soils are poorly drained and are on flatwoods. Lynn Haven and Wesconnett soils are very poorly drained and are in depressions. Ousley and Osier soils are on terraces along the St. Marys River. Resota soils are moderately well drained, do not have a spodic horizon, and are on slightly elevated ridges on flatwoods. Ridgewood soils are somewhat poorly drained. Rutlege soils are very poorly drained and are in drainageways.

Typical pedon of Mandarin fine sand; in a wooded area, approximately 2 miles south of Yulee, 50 feet south of Radio Avenue, 0.5 mile east of U.S. Highway 17, Land Grant 42, T. 2 N., R. 27 E.

Ap—0 to 6 inches; very dark gray (10YR 3/1) fine sand; weak medium granular structure; very friable; many fine and common medium roots; extremely acid; clear wavy boundary.

E1—6 to 12 inches; gray (10YR 6/1) fine sand; single grained; loose; many fine and common medium roots; extremely acid; gradual wavy boundary.

E2—12 to 20 inches; light gray (10YR 7/1) fine sand; single grained; loose; common fine and medium roots; very strongly acid; abrupt wavy boundary.

Bh1—20 to 22 inches; dark reddish brown (5YR 2/2) fine sand; 40 percent light gray (10YR 7/1) tongues extend from the horizon above; massive; very friable; few uncoated sand grains; few fine roots; extremely acid; clear wavy boundary.

Bh2—22 to 25 inches; dark reddish brown (5YR 3/2) fine sand; 35 percent light gray (10YR 7/1) tongues that have dark reddish brown (5YR 2/2) exteriors extend from the horizon above; massive; friable; sand grains coated with organic matter; extremely acid; gradual wavy boundary.

Bh3—25 to 31 inches; dark reddish brown (5YR 3/3) fine sand; 20 percent light gray (10YR 7/1) tongues that have dark reddish brown (5YR 2/2 and 3/2) exteriors extend from the horizon above; massive; friable; sand grains coated with organic matter; extremely acid; gradual wavy boundary.

BC—31 to 59 inches; yellowish brown (10YR 5/4) fine sand; common medium faint brown (10YR 4/3) mottles; 15 percent light gray (10YR 7/1) tongues that have dark reddish brown (5YR 2/2, 3/2, and 3/3) exteriors extend from the horizon above; single grained; loose; extremely acid; gradual wavy boundary.

C—59 to 80 inches; white (10YR 8/1) fine sand; single grained; loose; very strongly acid.

Reaction ranges from extremely acid to strongly acid. Depth to the Bh horizon is less than 30 inches.

The A horizon has hue of 10YR, value of 2 to 6, and chroma of 1 or is neutral in hue and has value of 3 to 5. It is 2 to 7 inches thick.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2. It is 10 to 24 inches thick.

The Bh horizon has hue of 2.5YR, value of 2 or 3, and chroma of 2 to 4; hue of 5YR, value of 2 or 3, and chroma of 1 to 4; hue of 7.5YR, value of 3 or 4, and chroma of 2 to 4; or hue of 10YR, value of 2 or 3, and chroma of 1 to 3. Tongues of light gray (10YR 7/1) extend from the horizon above. This horizon is 4 to 34 inches thick.

The BC horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4 or has hue of 7.5YR and value of 4 and chroma of 2 to 4 or value of 5 and chroma of 4. This horizon is 2 to 30 inches thick.

Some pedons have an E′ horizon that has hue of 10YR, value of 5 to 8, and chroma of 1 or 2. This horizon is as much as 40 inches thick.

Some pedons have a B′h horizon to a depth of more than 80 inches. It has the same color range as the Bh horizon.

The C horizon to a depth of more than 80 inches has hue of 10YR or 2.5Y, value of 6 to 8, and chroma of 1 to 3.

Maurepas Series

The Maurepas series consists of deep, nearly level, very poorly drained, acid soils. These soils formed in nonwoody, fibrous, hydrophytic plant remains. They are in drainageways along the tributaries of major streams that are influenced by tidal action. These soils are rapidly permeable. Generally, the water table is at or above the surface for 6 to 9 months of the year. Slopes are smooth or concave and are 0 to 1 percent. The Maurepas soils are euic, thermic Typic Medisaprists.

The Maurepas soils are closely associated on the landscape with Hurricane, Leon, Kingsferry, Evergreen, and Croatan soils. Hurricane, Leon, and Kingsferry soils are of mineral origin and are on flatwoods. Evergreen soils have organic material less than 16 inches thick underlain by mineral material and are in swamp hardwoods in depressions. Croatan soils have organic material 16 to 51 inches thick underlain by a loamy substratum and are in swamp hardwoods in drainageways.

Typical pedon of Maurepas muck, frequently flooded; 0.25 mile north of the edge of swamp and mineral soils, 0.15 mile south of Alligator Creek, SE¼NE¼SW¼ sec. 20, T. 2 N., R. 26 E.

Oe—0 to 5 inches; very dark brown (10YR 2/2) muck; 45 percent fiber, unrubbed, and 20 percent fiber, rubbed; massive; friable; many fine roots; medium acid (pH of 5.2 in calcium chloride); gradual wavy boundary.

Oa—5 to 80 inches; black (10YR 2/1) muck; 10 percent fiber, unrubbed, and 5 percent fiber, rubbed; massive; very friable; few fine roots; yellowish brown (10YR 5/4) sodium pyrophosphate extract; slightly acid (pH of 5.7 in calcium chloride).

The organic material is 51 to more than 80 inches thick. Reaction is 4.5 or more in calcium chloride or is medium acid to neutral in water.

The Oe layer has hue of 5YR to 10YR, value of 3 or less, and chroma of 2 or less. It contains 40 to 90 percent fiber, unrubbed, and 20 to 40 percent fiber, rubbed. It is as much as 10 inches thick. Some pedons do not have an Oe layer.

The Oa layer has hue of 10YR, 7.5YR, or 5YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 3. It contains 10 to 40 percent fiber, unrubbed, and less than ⅙ of the volume is fiber, rubbed. Fibers remaining after rubbing are dominantly woody. A few logs and large fragments of wood are in the lower part of the organic layers in some pedons. This horizon is 51 to 80 inches thick.

Typically, the organic layers are underlain by semifluid gray clay; but in some pedons these layers are underlain by fine sand at a depth of more than 51 inches.

Meadowbrook Series

The Meadowbrook series consists of nearly level and gently sloping, poorly drained and very poorly drained soils. These soils formed in marine deposits of sandy and loamy sediments. They are on broad, low flats, on side slopes, and in sloughs in flatwood areas. These soils are moderately slowly permeable. Generally, the water table is at a depth of less than 12 inches for 3 to 6 months of the year and at a depth of 12 to 30 inches for 6 to 9 months. In depressions the water table is at or above the surface for 6 to 9 months. Slopes are smooth or convex and range from 0 to 5 percent. The Meadowbrook soils are loamy, siliceous, thermic Grossarenic Ochraqualfs.

The Meadowbrook soils are closely associated on the landscape with Blanton, Croatan, Ellabelle, Chaires, Ocilla, Goldhead, and Sapelo soils. Blanton and Ocilla soils are somewhat poorly drained. They are on slightly elevated ridges and knolls. Croatan soils are very poorly drained, have an organic layer about 16 to 51 inches thick, and are in depressions. Ellabelle soils are very poorly drained and are in drainageways. Chaires and Sapelo soils have a spodic horizon and are on flatwoods. Goldhead soils have an argillic horizon at a depth of 20 to 40 inches and are on broad, low flats and in sloughs and depressions.

Typical pedon of Meadowbrook fine sand; in a wooded area, about 6.5 miles northeast of Callahan, 0.8 mile north of Florida State Highways A1A and 200, about 2.5 miles east of Griffin Road, under a power line, NE¼SW¼ sec. 6, T. 2 N., R. 26 E.

A—0 to 8 inches; black (10YR 2/1) fine sand; moderate medium granular structure; very friable; many fine and common medium roots; extremely acid; clear smooth boundary.

E1—8 to 14 inches; dark gray (10YR 4/1) fine sand; common medium distinct very dark gray (10YR 3/1) streaks; common medium distinct light gray (10YR

6/1) uncoated sand grains; single grained; loose; common fine roots; extremely acid; gradual wavy boundary.

E2—14 to 30 inches; gray (10YR 5/1) fine sand; fine medium distinct dark brown (10YR 3/3) and few fine prominent dark reddish brown (5YR 3/3) streaks; single grained; loose; few fine roots; strongly acid; gradual wavy boundary.

E3—30 to 44 inches; light gray (10YR 6/1) fine sand; single grained; loose; few fine roots; strongly acid; abrupt irregular boundary.

Btg1—44 to 61 inches; greenish gray (5GY 5/1) sandy clay loam; medium distinct dark grayish brown (10YR 4/2), common medium prominent strong brown (7.5YR 5/8), and common fine prominent yellowish red (5YR 5/8) mottles; few vertical channels of light gray (10YR 6/1) fine sand, 1 to 1.5 inches in diameter and 2 to 10 inches long; moderate medium subangular blocky structure; firm; few fine roots; sand grains bridged and coated with clay; strongly acid; gradual wavy boundary.

Btg2—61 to 80 inches; greenish gray (5GY 5/1) sandy clay loam; medium distinct dark grayish brown (10YR 4/2) and yellowish brown (10YR 5/6) mottles; moderate coarse subangular blocky structure; firm; few fine roots; sand grains coated with clay; very strongly acid.

The thickness of the solum ranges from 72 to more than 100 inches. Reaction ranges from extremely acid to strongly acid except where lime has been added. The underlying argillic horizon is at a depth of 40 to less than 80 inches.

Some pedons have an Oe horizon that has hue of 10YR, value of 2, and chroma of 1. It is as much as 8 inches thick.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or is neutral in hue and has value of 2 to 4. It is 4 to 12 inches thick. Where this horizon is very dark gray or black, it is less than 8 inches thick.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It is 36 to 70 inches thick.

The Btg horizon has hue of 10YR, 2.5Y, 5Y, or 5GY or is neutral in hue. It has value of 5 or 6 and chroma of 0 to 2. Few to many, fine or medium, brown, yellow, and red mottles are throughout the horizon. The texture is fine sandy loam or sandy clay loam. Some pedons have pockets of loamy fine sand and sandy clay. The clay content ranges from 15 to 35 percent.

Meggett Series

The Meggett series consists of nearly level and gently sloping, poorly drained and very poorly drained soils. These soils formed in sandy, loamy, and clayey sediments. They are on broad, low flats, on side slopes, and in depressions. These soils are slowly permeable. Generally, the water table is at a depth of less than 12 inches for 3 to 8 months of the year and at a depth of 12 to 30 inches for the rest of the year. In depressions it is ponded for 6 to 9 months in most years. Slopes are smooth or convex and are 0 to 2 percent. The Meggett soils are fine, mixed, thermic Typic Albaqualfs.

The Meggett soils are closely associated on the landscape with Brookman, Goldhead, and Buccaneer soils. Brookman soils are in depressions. Goldhead soils are in landscape positions similar to those of the Meggett soils. They have an argillic horizon that has high base saturation. Buccaneer soils have a mollic epipedon and are in drainageways.

Typical pedon of Meggett loamy fine sand; in a wooded area, approximately 4.5 miles east of Hilliard, 1 mile north of Florida State Highway 108, about 25 feet east of a logging trail, SW¼NE¼ sec. 6, T. 3 N., R. 25 E.

A1—0 to 6 inches; very dark gray (10YR 3/1) loamy fine sand; moderate medium granular structure; very friable; many fine roots; extremely acid; clear wavy boundary.

A2—6 to 12 inches; dark gray (10YR 4/1) loamy fine sand; many medium distinct light brownish gray (10YR 6/2) mottles; weak fine granular structure; very friable; common fine roots; very strongly acid; gradual wavy boundary.

E—12 to 16 inches; light brownish gray (10YR 6/2) loamy fine sand; common medium distinct yellowish brown (10YR 5/8) and common medium faint dark grayish brown (10YR 4/2) mottles; single grained; loose; common fine roots; strongly acid; abrupt irregular boundary.

Btg1—16 to 28 inches; grayish brown (10YR 5/2) sandy clay; few or common tongues of light brownish gray (10YR 6/2) loamy fine sand that has gray (10YR 5/1) exteriors; common medium distinct strong brown (7.5YR 5/8) mottles; weak very fine subangular blocky structure; firm; few fine roots; sand grains bridged and coated with clay; very strongly acid; gradual irregular boundary.

Btg2—28 to 47 inches; gray (10YR 5/1) clay; few or common tongues of light brownish gray (10YR 6/2) loamy fine sand that has gray (10YR 5/1) exteriors; many medium prominent yellowish red (5YR 5/6) and common medium prominent red (10R 4/8) mottles; weak coarse subangular blocky structure;

firm; few fine roots; faces of peds coated with clay; very strongly acid; gradual irregular boundary.

Btg3—47 to 68 inches; light olive gray (5Y 6/2) clay; few tongues of gray (10YR 5/1) sandy clay loam; common medium prominent brownish yellow (10YR 6/6) and reddish brown (2.5YR 4/4) mottles; weak coarse subangular blocky structure; firm; few fine roots; faces of peds coated with clay; very strongly acid; gradual wavy boundary.

Btg4—68 to 80 inches; light olive gray (5Y 6/2) clay; few fine prominent brownish yellow (10YR 6/6) mottles; weak coarse subangular blocky structure; firm; few fine roots; faces of peds coated with clay; strongly acid.

The thickness of the solum is 80 inches or more. Reaction is extremely acid to slightly acid in the A and E horizons and is extremely acid to moderately alkaline in the Btg horizon.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. It has an abrupt, smooth or wavy boundary in pedons that do not have an E horizon. It is 3 to 9 inches thick.

The E horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. Few or common mottles are in shades of gray. The texture is loamy fine sand or fine sandy loam. This horizon is as much as 9 inches thick.

The Btg horizon is mottled with hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 1 to 8. This horizon has dark greenish gray or greenish gray coatings on exterior peds, or the matrix has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. The texture is sandy clay, loam, or clay. The content of clay in the upper 20 inches of the Btg horizon ranges from 40 to 60 percent. The content of silt is less than 30 percent and generally is about 15 to 20 percent. The number of fine concretions of calcium carbonate or shell fragments ranges from none to common in the Btg horizon.

The BCg horizon, where present, has hue of 10YR to 5Y or is gleyed. It has value of 4 to 7 and chroma of 1 or 2. The texture is sandy clay or sandy clay loam. The number of fine concretions of calcium carbonate or shell fragments ranges from none to common.

Some pedons have a C or 2C horizon below a depth of about 50 inches that is variable or stratified from sandy to clayey.

The Meggett soils in this county are taxadjuncts because the epipedon is thicker than is defined as the range for the series. This difference does not significantly affect the use and management of the soils.

Newhan Series

The Newhan series consists of deep, gently rolling to hilly, excessively drained soils. These soils formed in marine sand reworked by wind and wave action. Generally, they are on gently undulating to hilly, narrow dunes near beaches along the Atlantic coast. These soils are very rapidly permeable. The water table is at a depth of more than 72 inches. Slopes are concave and convex and range from 5 to 20 percent. The Newhan soils are thermic, uncoated Typic Quartzipsamments.

The Newhan soils are closely associated on the landscape with Corolla, Echaw, Fripp, Kureb, and Mandarin soils. Corolla soils are moderately well drained and somewhat poorly drained and are on low dunes. Echaw and Mandarin soils have a spodic horizon and are on flatwoods. Echaw soils are moderately well drained, and Mandarin soils are somewhat poorly drained. Fripp soils are not affected by salt spray, are vegetated, and are in the western part of the sand dunes. Kureb soils have an E horizon and are just west of the sand dunes and on elevated ridges and knolls.

Typical pedon of Newhan fine sand, in an area of Newhan-Corolla, rarely flooded, fine sands, rolling; in a wooded area, approximately 7 miles south of Fernandina Beach, 0.5 mile east of Florida State Highway A1A, 100 feet south of Burney Blvd., sec. 20, T. 2 N., R. 28 E.

A—0 to 8 inches; white (10YR 8/1) fine sand; single grained; loose; common fine roots; neutral; gradual wavy boundary.

C—8 to 80 inches; very pale brown (10YR 7/3) fine sand; 1- to 5-millimeter streaks of brown minerals, which are more commonly 5 millimeters to 3 centimeters thick in the lower part; single grained; loose; few fine roots; neutral.

The thickness of the A and C horizons is more than 80 inches. Reaction generally is neutral or mildly alkaline. It ranges to slightly acid in the lower part. Calcareous shell fragments, mostly of sand size, make up 0 to 25 percent of the soil, by volume. The soil has very few to common grains of brown minerals.

The A horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2. It is 2 to 10 inches thick.

The C horizon to a depth of 80 inches or more has hue of 10YR or 2.5Y, value of 6 to 8, and chroma of 2 to 4. Small streaks of brown minerals are in the lower part of this horizon in some pedons.

Ocilla Series

The Ocilla series consists of nearly level and gently sloping, somewhat poorly drained soils. These soils formed in thick deposits of sandy and loamy materials. They are on narrow to broad ridges and on isolated knolls. These soils are moderately slowly permeable. Generally, the water table is at a depth of 12 to 30 inches for 2 to 6 months of the year and at a depth of 30 to 50 inches for 3 to 6 months or more. Slopes range from 0 to 5 percent. The Ocilla soils are loamy, siliceous, thermic Aquic Arenic Paleudults.

The Ocilla soils are closely associated on the landscape with Albany, Blanton, Ellabelle, Chaires, Goldhead, Meadowbrook, and Sapelo soils. Albany and Blanton soils have an argillic horizon below a depth of 40 inches. Albany soils are in landscape positions similar to those of the Ocilla soils. Blanton soils are moderately well drained and are in higher positions on the landscape. Ellabelle soils are very poorly drained and are on broad flats. Chaires and Sapelo soils have a spodic horizon. They are poorly drained and are on flatwoods. Goldhead and Meadowbrook soils are poorly drained and are on broad, low flats.

Typical pedon of Ocilla fine sand, 0 to 5 percent slopes; in a wooded area, about 5 miles northeast of Callahan, 1.4 miles north of Florida State Highway A1A, SE¼SE¼ sec. 2, T. 2 N., R. 25 E.

Ap—0 to 7 inches; gray (10YR 5/1) fine sand; common medium distinct dark yellowish brown (10YR 4/4) streaks; weak medium granular structure; many fine roots; very strongly acid; clear wavy boundary.

E1—7 to 20 inches; light yellowish brown (10YR 6/4) fine sand; common medium faint yellowish brown (10YR 5/4), few fine distinct yellowish brown (10YR 5/6), and few medium distinct light gray (2.5Y 7/2) mottles; single grained; loose; common fine roots; strongly acid; gradual wavy boundary.

E2—20 to 34 inches; light gray (2.5Y 7/2) fine sand; few fine distinct strong brown (7.5YR 5/8) streaks along root channels; single grained; loose; few fine roots; very strongly acid; clear wavy boundary.

BE—34 to 37 inches; brownish yellow (10YR 6/6) loamy fine sand; common fine faint yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; very friable; few fine roots; sand grains bridged and coated with clay; very strongly acid; clear wavy boundary.

Btg1—37 to 47 inches; gray (10YR 5/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) and common medium prominent red (10R 4/8) mottles; moderate medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Btg2—47 to 57 inches; gray (10YR 5/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) and common coarse prominent red (10R 4/8) mottles; moderate medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Btg3—57 to 80 inches; light brownish gray (2.5Y 6/2) fine sandy loam; few fine prominent red (10R 4/8) and few fine distinct light reddish brown (5YR 6/4) mottles; massive; firm; very strongly acid.

The thickness of the solum ranges from 70 to more than 80 inches. Reaction is strongly acid or very strongly acid except where lime has been added to the surface layer.

The A horizon has hue of 10YR or is neutral in hue. It has value of 3 to 5 and chroma of 0 to 2. It is 2 to 10 inches thick. If the value is 3.5 or less, this horizon is less than 7 inches thick.

The E horizon has hue of 10YR, value of 4 to 7, and chroma of 1 to 4 or hue of 2.5Y, value of 5 to 8, and chroma of 2 to 4. It may have mottles in shades of brown, olive, and gray. The texture is fine sand or loamy fine sand. This horizon is 16 to 33 inches thick.

The BE horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. Mottles are in shades of yellow and brown. Some pedons do not have a BE horizon.

The Bt horizon, where present, has hue of 2.5Y or 10YR, value of 5 to 7, and chroma of 3 to 6. Mottles are in shades of gray, yellow, brown, and red. The Btg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 5 to 7 and chroma of 0 to 2. The content of plinthite is less than 5 percent. The texture of the Bt and Btg horizons is dominantly sandy clay loam and ranges from sandy loam to sandy clay. Pockets of sandy loam are in some subhorizons. The weighted average of clay content in the upper 20 inches of the argillic horizon ranges from 15 to 35 percent. The content of plinthite ranges from none to about 3 percent.

Ortega Series

The Ortega series consists of nearly level to strongly sloping, moderately well drained soils. These soils formed in thick deposits of marine sand. They are on narrow to broad ridges and on isolated knolls. These soils are rapidly permeable. Generally, the water table is at a depth of 42 to 60 inches for 2 to 4 months of the year and recedes below a depth of 60 inches during the rest of the year. Slopes are smooth or convex and range from 0 to 12 percent. The Ortega soils are thermic, uncoated Typic Quartzipsamments.

The Ortega soils are closely associated on the landscape with Centenary, Hurricane, Kershaw, Mandarin, and Ridgewood soils. Centenary and Hurricane soils have a spodic horizon below a depth of 50 inches. Hurricane soils are on lower ridges than the Ortega soils. Kershaw soils are excessively drained and are on higher elevated ridges and knolls than the Ortega soils. Mandarin soils have a spodic horizon within 30 inches of the surface and are on elevated flatwoods. Ridgewood soils are somewhat poorly drained and are on lower ridges than the Ortega soils.

Typical pedon of Ortega fine sand, 0 to 5 percent slopes; in a wooded area, 5.5 miles north of Yulee, 100 feet north of Rayonier Road 6, about 50 feet east of Rayonier Road 7A, 1 mile west of Crandall Road, 0.2 mile south of St. Marys River, Land Grant 46, T. 3 N., R. 27 E.

A—0 to 6 inches; gray (10YR 5/1) fine sand; weak medium granular structure; very friable; many fine and medium and few coarse roots; strongly acid; clear smooth boundary.

C1—6 to 15 inches; brown (10YR 5/3) fine sand; single grained; loose; common fine and few medium roots; strongly acid; gradual wavy boundary.

C2—15 to 23 inches; light yellowish brown (10YR 6/4) fine sand; common medium faint brown (10YR 5/3) mottles; single grained; loose; few fine and medium roots; strongly acid; gradual wavy boundary.

C3—23 to 28 inches; pale brown (10YR 6/3) fine sand; common fine faint light gray (10YR 7/2) uncoated sand grains; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

C4—28 to 41 inches; pale brown (10YR 6/3) fine sand; common medium distinct yellowish brown (10YR 5/6) mottles; common medium faint light gray (10YR 7/2) uncoated sand grains; single grained; loose; very strongly acid; gradual wavy boundary.

C5—41 to 61 inches; light gray (10YR 7/1) fine sand; few fine distinct yellowish brown (10YR 5/6) and common medium faint light yellowish brown (10YR 6/4) mottles; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

C6—61 to 80 inches; light gray (5YR 7/1) fine sand; common medium distinct brownish yellow (10YR 6/6) and common fine prominent red (2.5YR 4/8) mottles; single grained; loose; strongly acid.

Reaction is very strongly acid to slightly acid. The content of silt plus clay is less than 5 percent within 10 to 40 inches of the surface.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. It is 1 to 6 inches thick.

The C horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 5 to 7 and chroma of 0 to 6. The thickness of this horizon ranges from 30 to 70 inches. In many pedons there are few or common, fine to coarse mottles or pockets of white or light gray uncoated sand grains. The color of these mottles or pockets is that of the uncoated sand grains and is not indicative of wetness. In some pedons mottles of reddish yellow, strong brown, and yellowish brown are in the C horizon below a depth of 40 inches.

Osier Series

The Osier series consists of nearly level, poorly drained soils. These soils formed in thick deposits of sandy alluvium. They are on flood plains and in drainageways on the St. Marys River. These soils are rapidly permeable. The water table is within 6 inches of the surface for 3 to 6 months in most years. Slopes are smooth or convex and are 0 to 2 percent. The Osier soils are siliceous, thermic Typic Psammaquents.

The Osier soils are closely associated on the landscape with Ellabelle, Mandarin, and Ousley soils. Ellabelle soils have an argillic horizon and are in drainageways and on flood plains. Mandarin soils are on low terraces, are somewhat poorly drained, and have a spodic horizon. Ousley soils are on low terraces and flood plains and are moderately well drained.

Typical pedon of Osier loamy fine sand, frequently flooded; on a flood plain, 100 feet south of creek, 0.2 mile east of St. Marys River, 0.6 mile west of Nassau County Road 121, about 1 mile north of junction of County Roads 121 and 115, about 7.6 miles east of Hilliard, Land Grant 38, T. 3 N., R. 23 E.

A1—0 to 5 inches; very dark gray (10YR 3/1) loamy fine sand; moderate medium granular structure; very friable; many fine, medium, and coarse roots; extremely acid; clear smooth boundary.

A2—5 to 14 inches; dark grayish brown (10YR 4/2) loamy fine sand; few fine faint grayish brown (10YR 5/2) mottles; weak fine granular structure; very friable; many fine and few medium roots; extremely acid; gradual wavy boundary.

Cg1—14 to 31 inches; grayish brown (10YR 5/2) fine sand; common medium faint dark grayish brown (10YR 4/2) and light brownish gray (10YR 6/2) and common medium distinct strong brown (7.5YR 4/6) mottles; single grained; loose; common fine and few fine roots; very strongly acid; gradual wavy boundary.

Cg2—31 to 38 inches; grayish brown (10YR 5/2) fine sand; few fine faint dark grayish brown (10YR 4/2) mottles; single grained; loose; very strongly acid; clear wavy boundary.

Cg3—38 to 43 inches; light brownish gray (10YR 6/2) fine sand; few fine distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/8) mottles; single grained; loose; extremely acid; abrupt smooth boundary.

Cg4—43 to 46 inches; dark grayish brown (10YR 4/2) fine sand; single grained; loose; very strongly acid; clear smooth boundary.

Cg5—46 to 50 inches; grayish brown (10YR 5/2) loamy fine sand; common fine distinct strong brown (7.5YR 5/6) streaks along root channels; massive; friable; very strongly acid; abrupt smooth boundary.

Cg6—50 to 80 inches; white (10YR 8/1) fine sand; common coarse faint light gray (10YR 6/1) mottles; single grained; loose; strongly acid.

Reaction ranges from extremely acid to medium acid.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. Mottles are in shades of brown and gray in the lower part of this horizon. The texture is fine sand or loamy fine sand. This horizon is 3 to 20 inches thick. It is less than 6 inches thick if value is 3.5 or less.

The Cg horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 4 to 8 and chroma of 0 to 2. The number of mottles ranges from none to common. The mottles are in shades of brown, yellow, and gray. The texture is fine sand or loamy fine sand. The texture in some pedons that have thin strata of material ranges from fine sand to fine sandy loam. The content of silt plus clay in the 10- to 40-inch control section is 5 to 15 percent.

Ousley Series

The Ousley series consists of nearly level and gently sloping, somewhat poorly drained soils. These soils formed in fluvial sediment near the St. Marys River. They are on low terraces and on flood plains. These soils are rapidly permeable. The seasonal high water table is at a depth of 18 to 36 inches for 4 to 6 months each year and at a depth of more than 36 inches the rest of the year. Flooding occurs two or three times during the year for periods of 2 to 7 days. Slopes are smooth, convex, or concave and range from 0 to 5 percent. The Ousley soils are thermic, uncoated Aquic Quartzipsamments.

The Ousley soils are closely associated on the landscape with Ellabelle, Mandarin, Osier, and Rutlege soils. Ellabelle and Rutlege soils are very poorly drained. Osier soils are poorly drained, are in lower positions on the landscape than the Ousley soils, and are frequently flooded. Mandarin soils are in slightly lower positions on the landscape, are occasionally flooded, and have a spodic horizon.

Typical pedon of Ousley fine sand, in an area of Ousley and Mandarin fine sands, occasionally flooded; in a wooded area, along the power line, 500 feet east of St. Marys River, 0.6 mile north of county boat landing, Land Grant 41, T. 4 N., R. 23 E.

A1—0 to 7 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; very friable; many fine and common medium roots; very strongly acid; abrupt wavy boundary.

C1—7 to 16 inches; light gray (10YR 7/1) fine sand; single grained; loose; common fine and few medium roots; very strongly acid; gradual wavy boundary.

C2—16 to 23 inches; pale brown (10YR 6/3) fine sand; few fine distinct light gray (10YR 7/1) mottles; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

C3—23 to 40 inches; olive yellow (2.5Y 6/6) fine sand; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

C4—40 to 45 inches; yellow (10YR 7/6) fine sand; common fine faint light gray (10YR 7/1) mottles; single grained; loose; very strongly acid; gradual wavy boundary.

C5—45 to 70 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; very strongly acid; gradual wavy boundary.

C6—70 to 80 inches; brown (10YR 5/3) fine sand; single grained; loose; very strongly acid.

The thickness of the sandy horizons is 80 inches or more. Reaction is very strongly acid or strongly acid. The content of silt plus clay in the 10- to 40-inch control section averages 2 to 5 percent.

The A horizon has hue of 10YR or 2.5Y, value of 3 to 7, and chroma of 1 or 2. It is 4 to 24 inches thick. If the value is 3.5 or less, the horizon is less than 10 inches thick.

The C horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 to 4. Mottles having chroma of 2 or less are within 40 inches of the surface and can occur in the lower part of the C horizon. Small pockets and thin strata of coated sand grains are in some pedons.

Penney Series

The Penney series consists of nearly level and gently sloping, excessively drained soils. These soils formed in thick deposits of marine sand. They are on broad ridges and isolated knolls. These soils are rapidly permeable. The water table is at a depth of more than 72 inches. Slopes are smooth or convex and range from 0 to 5 percent. The Penney soils are thermic, uncoated Typic Quartzipsamments.

The Penney soils are closely associated on the landscape with Albany, Blanton, Ortega, and Ridgewood soils. All of the associated soils are in lower positions on the landscape than the Penney soils. Albany and Blanton soils have an argillic horizon below a depth of 40 inches. Albany and Ridgewood soils are somewhat poorly drained. Blanton soils are moderately well drained and somewhat poorly drained. Ortega soils are moderately well drained.

Typical pedon of Penney fine sand, 0 to 5 percent slopes; in a cultivated field, 0.25 mile northeast of Land Grant line, 0.85 mile northwest of Land Grant line, 3 miles southwest of Boulogne, Land Grant 43, T. 4 N., R. 23 E.

A—0 to 5 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; very friable; many fine and few medium roots; many uncoated sand grains; very strongly acid; clear smooth boundary.

E1—5 to 15 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; common fine and few medium roots; many uncoated sand grains; strongly acid; gradual wavy boundary.

E2—15 to 30 inches; very pale brown (10YR 7/4) fine sand; few fine faint light gray (10YR 7/2) uncoated sand grains; many very fine black charcoal fragments; single grained; loose; few fine and few medium roots; strongly acid; gradual wavy boundary.

E3—30 to 41 inches; very pale brown (10YR 7/3) fine sand; few medium faint light gray (10YR 7/1) uncoated sand grains; single grained; loose; few fine and few medium roots; very strongly acid; gradual wavy boundary.

E&Bt1—41 to 54 inches; very pale brown (10YR 7/3) fine sand; few medium faint light gray (10YR 7/1) uncoated sand grains; single grained; loose; brownish yellow (10YR 6/6) loamy fine sand lamellae, 2 to 5 inches long and 1/16 to 1/8 inch thick, with well coated sand grains; very strongly acid; gradual wavy boundary.

E&Bt2—54 to 80 inches; very pale brown (10YR 7/3) fine sand; single grained; loose; brownish yellow (10YR 6/6) loamy fine sand lamellae, 3 to 12 inches long and 1/8 to 1/4 inch thick, with well coated sand grains; strongly acid.

The solum is 80 inches or more thick. The content of silt plus clay is less than 5 percent at a depth of 10 to 40 inches. Thin lamellae, 1/16 to 1/4 inch thick, are at a depth of 41 to 54 inches. Reaction is extremely acid to medium acid. The texture is sand or fine sand except for the lamellae, which range from sand or fine sand to fine sandy loam.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 8, and chroma of 6 to 8 or hue of 10YR, value of 5 to 7, and chroma of 3 to 8. In some pedons there are few or common, fine and medium streaks that have hue of 10YR, value of 7 or 8, and chroma of 1 or 2. The color in these streaks is that of the uncoated sand grains and is not indicative of wetness.

The E part of the E&Bt horizon has hue of 10YR, value of 6 to 8, and chroma of 3 to 8. It has small pockets of light gray or white sand grains. It is 2 to 8 inches thick between the lamellae. The Bt part occurs as lamellae that have hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 to 8. The lamellae range from 1/32 to 1/4 inch in thickness and from 1/2 inch to 24 inches in length. They are at a depth of 41 to 80 inches and extend to a depth of more than 80 inches. They generally increase in thickness as depth increases.

Pottsburg Series

The Pottsburg series consists of nearly level, poorly drained soils. These soils formed in thick deposits of marine sand. They are on flatwoods. These soils are moderately permeable. Generally, the water table is at a depth of 12 to 24 inches for 1 to 4 months of the year and at a depth of 24 to 42 inches for 4 months or more in most years. Slopes are smooth or convex and are 0 to 2 percent. The Pottsburg soils are sandy, siliceous, thermic Grossarenic Haplaquods.

The Pottsburg soils are closely associated on the landscape with Boulogne, Evergreen, Hurricane, Kingsferry, Leon, Mandarin, and Rutlege soils. Boulogne and Leon soils have a spodic horizon within 30 inches of the surface and are on flatwoods. Evergreen soils are very poorly drained, have a histic epipedon, and are in depressions. Hurricane and Mandarin soils are somewhat poorly drained and are on higher ridges than the Pottsburg soils. Kingsferry soils are very poorly drained and have a spodic horizon at a depth of 30 to 50 inches. Rutlege soils are very poorly drained, do not have a spodic horizon, and are in drainageways.

Typical pedon of Pottsburg fine sand, in an area of Hurricane-Pottsburg fine sands, 0 to 5 percent slopes; in a wooded area, approximately 3.5 miles east of Hilliard, 700 feet southwest of trail, NW¼SE¼ sec. 2, T. 3 N., R. 23 E.

A—0 to 8 inches; very dark gray (10YR 3/1) fine sand; fine medium granular structure; very friable; common medium and many fine roots; extremely acid; clear smooth boundary.

E1—8 to 15 inches; brown (10YR 5/3) fine sand; single grained; loose; common fine roots; extremely acid; gradual wavy boundary.

E2—15 to 40 inches; dark gray (10YR 4/1) fine sand; single grained; loose; common fine roots; extremely acid; gradual wavy boundary.

E3—40 to 55 inches; gray (10YR 5/1) fine sand; single grained; loose; extremely acid; abrupt wavy boundary.

Bh1—55 to 60 inches; dark reddish brown (5YR 3/2) fine sand; massive; very friable; sand grains well coated with organic matter; extremely acid; clear wavy boundary.

Bh2—60 to 80 inches; dark reddish brown (5YR 2/2) fine sand; massive; friable; sand grains well coated with organic matter; extremely acid.

The thickness of the solum is 80 inches or more. Depth to the spodic horizon is 51 to 79 inches. Reaction ranges from medium acid to extremely acid.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2. It is 6 to 8 inches thick.

The E horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 to 3 in the upper part and has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 or 2 in the lower part. In some pedons the E horizon has few or common, fine to coarse, faint very pale brown, pale brown, or yellowish brown mottles. This horizon is 43 to 70 inches thick.

The Bh horizon has hue of 5YR, value of 2 to 4, and chroma of 1 to 4; hue of 7.5YR, value of 3 or 4, and chroma of 1 or 2; or hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The sand grains in this horizon are well coated with organic matter.

Resota Series

The Resota series consists of nearly level and gently sloping, moderately well drained soils. These soils formed in thick beds of marine fluvial or eolian sand. They are on narrow to broad ridges and on isolated knolls along the Atlantic coast. These soils are very rapidly permeable. The water table is at a depth of 42 to 60 inches for 6 months or more of the year and at a depth of 60 to 80 inches in dry periods. Slopes are smooth or convex and range from 0 to 5 percent. The Resota soils are thermic, uncoated Spodic Quartzipsamments.

The Resota soils are closely associated on the landscape with Echaw, Kureb, Mandarin, Ortega, and Ridgewood soils. Echaw and Mandarin soils have a spodic horizon and are on slightly elevated ridges. Kureb soils are excessively drained and are on uplands and sand dune ridges. Ortega and Ridgewood soils do not have an E horizon and are on elevated ridges.

Typical pedon of Resota fine sand, 0 to 5 percent slopes; in a wooded area, approximately 7 miles south of Fernandina Beach, 0.2 mile east of Florida State Highway A1A, 100 feet south of Lewis Street, sec. 20, T. 2 N., R. 28 E.

A—0 to 4 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; very friable; few coarse and many fine and medium roots; salt-and-pepper appearance, when dry; extremely acid; abrupt smooth boundary.

E1—4 to 7 inches; gray (10YR 6/1) fine sand; single grained; loose; common medium and fine roots; very strongly acid; clear wavy boundary.

E2—7 to 23 inches; light gray (10YR 7/1) fine sand; single grained; loose; common fine and few medium roots; very strongly acid; gradual wavy boundary.

E3—23 to 27 inches; light gray (10YR 7/1) fine sand; common medium distinct light yellowish brown (10YR 6/4) bodies; single grained; loose; few fine and medium roots; strongly acid; abrupt irregular boundary.

Bw1—27 to 31 inches; yellowish brown (10YR 5/8) fine sand; about 25 percent light gray (10YR 7/1) vertical channels extend from the horizon above; few or common dark brown (7.5YR 4/4) and dark reddish brown (5YR 3/2) bands; intermittent bands at horizon contact and vertical bands along walls of vertical channels; single grained; loose; common fine roots; strongly acid; gradual wavy boundary.

Bw2—31 to 50 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; few fine roots; strongly acid; gradual wavy boundary.

Bw3—50 to 80 inches; light yellowish brown (10YR 6/4) fine sand; common medium distinct light brownish gray (10YR 6/2) mottles; single grained; loose; very strongly acid.

The solum is 40 inches or more thick. Reaction ranges from extremely acid to slightly acid.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 2 or less. A mixture of dark organic matter and light gray uncoated sand grains has a salt-and-pepper appearance. This horizon is 2 to 8 inches thick.

The E horizon has hue of 10YR, value of 6 to 8, and chroma of 2 or less. Mottles are in shades of yellow and brown. This horizon is 6 to 34 inches thick.

The Bw horizon has hue of 10YR or 7.5YR, value of 5 to 7, and chroma of 4 to 8. In some pedons few or common, gray and yellowish or reddish mottles are in this horizon below a depth of 40 inches. Some pedons have thin discontinuous Bh bodies at the contact base of the E horizon and the surrounding tongues of E horizon material. In some pedons this horizon has dark reddish brown or dark brown bands. The thickness of the Bw horizon ranges from 10 to 54 inches.

Some pedons have a C horizon to a depth of 80 inches or more that has hue of 10YR, value of 6 to 8, and chroma of 1 to 3. Few and common mottles are gray, yellow, brown, and red.

Ridgewood Series

The Ridgewood series consists of nearly level and gently sloping, somewhat poorly drained soils. These soils formed in thick deposits of marine sand. They are on narrow to broad ridges and on isolated knolls on flatwoods. These soils are rapidly permeable. Generally, the high water table is at a depth of 18 to 42 inches for 2 to 4 months of the year. It rises to a depth of 15 to 24 inches during periods of heavy rainfall. Slopes are smooth or convex and range from 0 to 5 percent. The Ridgewood soils are thermic, uncoated Aquic Quartzipsamments.

The Ridgewood soils are closely associated on the landscape with Centenary, Mandarin, Evergreen, Hurricane, Leon, Lynn Haven, Ortega, and Wesconnett soils. Centenary and Ortega soils are better drained than the Ridgewood soils and are on the higher elevated ridges. Centenary soils have a spodic horizon. Mandarin soils have a spodic horizon within 30 inches of the surface and are on slightly elevated flatwoods. Evergreen, Lynn Haven, and Wesconnett soils are very poorly drained and are in depressions. Hurricane soils have a spodic horizon below a depth of 50 inches and are in landscape positions similar to those of the Ridgewood soils. Leon soils have a spodic horizon, are poorly drained and very poorly drained, and are on broad flatwoods and in depressions.

Typical pedon of Ridgewood fine sand, 0 to 5 percent slopes; in a wooded area, 3.5 miles east of Yulee, 0.25 mile east of Rayonier Road, 0.9 mile south of Florida State Highways 200 and A1A, NW¼NW¼ sec. 26, T. 2 N., R. 28 E.

Ap—0 to 7 inches; gray (10YR 5/1) fine sand; common medium distinct dark brown (10YR 4/3) bodies; single grained; loose; few coarse and medium and many fine roots; very strongly acid; clear wavy boundary.

Bw—7 to 24 inches; light yellowish brown (2.5Y 6/4) fine sand; common fine distinct very dark gray (10YR 3/1) organic specks; single grained; loose; common fine and medium roots; strongly acid; gradual wavy boundary.

C1—24 to 29 inches; light yellowish brown (2.5Y 6/4) fine sand; common medium distinct strong brown (7.5YR 5/8) mottles; few fine distinct very dark gray (10YR 3/1) organic specks; single grained; loose; common fine and medium roots; strongly acid; gradual wavy boundary.

C2—29 to 35 inches; pale brown (10YR 6/3) fine sand; common medium faint light brownish gray (10YR 6/2) and common medium distinct strong brown (7.5YR 5/8) mottles; single grained; loose; common fine roots; strongly acid; gradual wavy boundary.

C3—35 to 46 inches; light gray (10YR 7/2) fine sand; common medium distinct yellowish brown (10YR 5/6) and common fine distinct strong brown (7.5YR 5/8) mottles; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.

C4—46 to 80 inches; light gray (10YR 7/1) fine sand; few fine distinct brownish yellow (10YR 6/8) mottles; single grained; loose; neutral.

The thickness of the sandy horizon is 80 inches or more. Reaction ranges from very strongly acid to neutral. The C horizon is at a depth of 15 to 40 inches. The content of silt plus clay in the 10- to 40-inch control section averages from 2 to 5 percent.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. It is 3 to 8 inches thick.

The Bw horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 or 4. Mottles having chroma of 2 or less are within 40 inches of the surface in some pedons. This horizon is 10 to 38 inches thick.

The C horizon to a depth of 80 inches or more has hue of 10YR, 2.5Y, or 5Y, value of 5 to 7, and chroma of 1 to 4. The number of gray, brown, and yellow mottles ranges from few to many.

Rutlege Series

The Rutlege series consists of nearly level, very poorly drained soils. They formed in deposits of sandy marine sediment. They are in narrow drainageways. These soils are rapidly permeable. The water table is at or near the surface most of the year. In many areas these soils are frequently flooded for brief periods. Slopes are 0 to 2 percent. The Rutlege soils are sandy, siliceous, thermic Typic Humaquepts.

The Rutlege soils are closely associated on the landscape with the Boulogne, Evergreen, Hurricane, Kingsferry, Leon, and Ridgewood soils. All of the associated soils except Hurricane and Ridgewood soils have a spodic horizon and are on flatwoods. Hurricane and Ridgewood soils are somewhat poorly drained and are on slightly elevated ridges.

Typical pedon of Rutlege mucky fine sand, frequently flooded; in a wooded area, approximately 0.2 mile southeast of O'Neil, 50 feet south of Rayonier Road 3A, 0.15 mile east of Rayonier Road 31A, SW¼SE¼ sec. 30, T. 2 N., R. 28 E.

A1—0 to 12 inches; black (10YR 2/1) mucky fine sand; moderate medium granular structure; very friable; many fine and medium and few coarse roots; strongly acid; gradual wavy boundary.

A2—12 to 16 inches; very dark gray (10YR 3/1) fine sand; single grained; loose; few fine roots; very strongly acid; clear wavy boundary.

Cg1—16 to 18 inches; dark gray (10YR 4/1) fine sand; single grained; loose; few fine roots; very strongly acid; clear wavy boundary.

Cg2—18 to 35 inches; gray (10YR 5/1) fine sand; single grained; loose; very strongly acid; clear wavy boundary.

Cg3—35 to 80 inches; light gray (10YR 6/1) fine sand; single grained; loose; very strongly acid.

The thickness of the solum is 10 to 24 inches. The content of silt plus clay in the 10- to 40-inch control section is 5 to 15 percent. Reaction is very strongly acid or extremely acid.

The A horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. It is more than 10 inches thick. The upper 6 to 12 inches of the A horizon contains 3 to 20 percent organic matter. The organic matter in the lower part is somewhat less.

The C horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 5 to 7 and chroma of 0 to 2 if mottled or value of 4 to 7 and chroma of 0 or 1 if not mottled. The texture is fine sand or loamy fine sand.

Sapelo Series

The Sapelo series consists of nearly level, poorly drained, acid soils. These soils formed in thick deposits of loamy and sandy sediments. They are on broad flatwoods. These soils are moderately slowly permeable. Generally, the water table is at a depth of 6 to 18 inches for 1 to 4 months of the year. Slopes are smooth or convex and are 0 to 2 percent. The Sapelo soils are sandy, siliceous, thermic Ultic Haplaquods.

The Sapelo soils are closely associated on the landscape with Albany, Ellabelle, Kingsferry, Leon, Chaires, Ocilla, Goldhead, and Meadowbrook soils. All of the associated soils except Leon, Chaires, and Kingsferry soils do not have a spodic horizon. Leon, Chaires, and Kingsferry soils are on flatwoods. Albany and Ocilla soils are somewhat poorly drained and are on slightly elevated ridges. Ellabelle soils are more poorly drained than Sapelo soils and are in drainageways. Kingsferry and Leon soils do not have an argillic horizon. Chaires soils have an argillic horizon within 40 inches of the surface. Goldhead and Meadowbrook soils are in sloughs and depressions.

Typical pedon of Sapelo fine sand; in a wooded area, 4.5 miles northeast of Callahan, 0.3 mile north of Florida State Highways A1A and 200, about 100 feet south of the logging trail, SE¼SE¼ sec. 11, T. 2 N., R. 25 E.

A—0 to 6 inches; black (10YR 2/1) fine sand; moderate medium granular structure; very friable; many fine, many medium, and common coarse roots; extremely acid; clear smooth boundary.

E1—6 to 10 inches; gray (10YR 5/1) fine sand; single grained; loose; many fine, many medium, and few coarse roots; extremely acid; clear smooth boundary.

E2—10 to 21 inches; light gray (10YR 6/1) fine sand; single grained; loose; few fine, few medium, and few coarse roots; very strongly acid; abrupt wavy boundary.

Bh—21 to 27 inches; black (5YR 2/1) fine sand; massive; firm; few fine roots; sand grains coated with organic matter; extremely acid; clear wavy boundary.

E′—27 to 43 inches; brown (7.5YR 5/4) loamy fine sand; many medium faint dark brown (7.5YR 4/2) streaks; single grained; loose; few fine roots; extremely acid; gradual wavy boundary.

Btg1—43 to 54 inches; gray (10YR 5/1) fine sandy loam; many coarse distinct yellowish brown (10YR 5/4) and few fine distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; very friable; few fine roots; sand grains coated with clay; extremely acid; gradual wavy boundary.

Btg2—54 to 70 inches; light brownish gray (2.5Y 6/2) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) and common medium prominent strong brown (7.5YR 5/8) mottles; weak coarse subangular blocky structure; friable; few fine roots; extremely acid; gradual wavy boundary.

C—70 to 80 inches; gray (5Y 5/1) loamy fine sand; common medium faint pale olive (5Y 6/3) and few medium prominent yellowish red (5YR 5/6) mottles; massive; very friable; very strongly acid.

The thickness of the solum ranges from 70 to 80 inches or more. Reaction ranges from extremely acid to strongly acid except where limed. The Bh horizon is at a depth of 15 to 30 inches, and the Btg horizon is at a depth of 40 to 70 inches.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. It is 3 to 8 inches thick.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It is 10 to 24 inches thick.

The Bh horizon has hue of 5YR, 7.5YR, or 10YR, value of 2 or 3, and chroma of 1 to 3 or is neutral in hue and has value of 2. The texture is fine sand or loamy fine sand. This horizon is 5 to 36 inches thick.

Some pedons have a BE horizon that has hue of 10YR, value of 4 to 7, and chroma of 3 or 4. This horizon is 5 to 20 inches thick. The texture is fine sand or loamy fine sand.

The E′ horizon has hue of 7.5YR or is neutral in hue. It has value of 5 to 7 and chroma of 0 to 4. Common or many red, yellow, and brown mottles or streaks are in some pedons. The number of fine to coarse weakly cemented Bh pockets ranges from none to common. This horizon is 2 to 22 inches thick. Some pedons do not have an E′ horizon.

The Btg horizon to a depth of 70 inches or more has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 5 to 7 and chroma of 0 to 2. Few or common mottles are yellow, red, and brown. The texture of this horizon is fine sandy loam or sandy clay loam. Pockets of sand and clay are in some pedons.

The C horizon to a depth of 80 inches or more has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. The texture is fine sand or loamy fine sand.

Tisonia Series

The Tisonia series consists of nearly level, very poorly drained, organic soils. These soils formed from nonwoody, halophytic plant remains underlain by fine textured sediment. They are in broad tidal marshes. These soils are very slowly permeable. Generally, fluctuating tides cover the surface twice daily. Slopes are 0 to 1 percent. The Tisonia soils are clayey, montmorillonitic, euic, thermic Terric Sulfihemists.

The Tisonia soils are closely associated on the landscape with Maurepas, Hurricane, Kingsland, Leon, and Mandarin soils. Maurepas and Kingsland soils are organic, do not have the sulfur content characteristic of the Tisonia soils, and are in swamp hardwoods. Hurricane, Leon, and Mandarin soils are mineral soils and are on flatwoods.

Typical pedon of Tisonia mucky peat, frequently flooded; on a grassy flat, 0.3 mile east of Delene Road, 5 miles south-southeast of Yulee, Land Grant 43, T. 2 N., R. 27 E.

Oe—0 to 15 inches; very dark grayish brown (2.5Y 3/2) mucky peat; about 60 percent fiber, unrubbed, and 35 percent fiber, rubbed; massive; very friable; many fine roots; light gray (10YR 6/1) sodium pyrophosphate extract; about 30 percent mineral material; noticeable sulfur smell; slightly acid in water at field moisture (air dry pH 5.2 in 0.01 molar calcium chloride); gradual wavy boundary.

Oe—15 to 40 inches; very dark grayish brown (10YR 3/2) partly decomposed organic matter; about 40 percent fiber, unrubbed, and 20 percent fiber, rubbed; massive; very friable; few fine roots; light brownish gray (10YR 6/2) sodium pyrophosphate extract; about 50 percent mineral material; noticeable sulfur smell; slightly acid in water at field moisture (air dry pH 5.2 in 0.01 molar calcium chloride); gradual wavy boundary.

C—40 to 65 inches; dark olive gray (5Y 3/2) clay; massive; flows easily between the fingers when squeezed; noticeable sulfur smell; neutral in water at field moisture (air dry pH 5.6 in 0.01 molar calcium chloride).

The content of sulfur ranges from 1.5 to about 3.5 percent. The organic material in all tiers is dominantly hemic. The thickness of the organic material is 16 to 45 inches. Reaction ranges from slightly acid to mildly alkaline in water. After air drying, pH in 0.01 molar calcium chloride decreases to medium acid or lower. Conductivity of the saturation extract ranges from 22 to 51 millimhos per centimeter.

The Oe horizon has hue of 10YR, 7.5YR, 2.5Y, or 5Y, value of 2 to 4, and chroma of 2. This horizon contains 35 to 80 percent fiber, unrubbed, and 20 to 40 percent fiber, rubbed.

The C horizon to a depth of more than 65 inches has hue of 10YR, 2.5Y, or 5Y; value of 3 to 5, and chroma of 1 or 2. The texture is clay. The material in this horizon flows easily between the fingers when squeezed. The N value is more than 1. The number of lenses of loamy fine sand and sandy loam ranges from none to common at a depth of more than 40 inches.

Wesconnett Series

The Wesconnett series consists of nearly level, very poorly drained, acid soils. These soils formed in thick deposits of marine sands. They are in shallow depressions. These soils are moderately permeable to rapidly permeable. Generally, the water table is above the surface for 6 to 12 months of the year. Slopes are smooth or concave and are 0 to 2 percent. The Wesconnett soils are sandy, siliceous, thermic Typic Haplaquods.

The Wesconnett soils are closely associated on the landscape with Evergreen, Hurricane, Kingsferry, Leon, and Lynn Haven soils. Evergreen soils are organic. Hurricane and Leon soils are somewhat poorly drained. Kingsferry soils are on broad, low flats. Leon soils are poorly drained. Lynn Haven soils have an E horizon.

Typical pedon of Wesconnett fine sand, in an area of Lynn Haven-Wesconnett-Leon complex, depressional; in a depressional area 100 feet north of Florida State Highway A1A, 0.15 mile west of Atlantic Ocean, 0.05 mile east of Amelia Island Parkway, 5.5 miles south of Fernandina Beach, sec. 13, T. 2 N., R. 28 E.

A1—0 to 4 inches; black (10YR 2/1) fine sand; weak medium granular structure; very friable; medium acid; gradual wavy boundary.

A2—4 to 12 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; medium acid; gradual wavy boundary.

Bh1—12 to 16 inches; black (5YR 2/1) fine sand; massive; very friable; sand grains coated with organic matter; strongly acid; gradual wavy boundary.

Bh2—16 to 30 inches; dark reddish brown (5YR 3/2) fine sand; massive; very friable; sand grains coated with organic matter; strongly acid; gradual wavy boundary.

Bh3—30 to 49 inches; dark reddish brown (5YR 2/2) fine sand; massive; very friable; strongly acid; gradual wavy boundary.

BC—49 to 65 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; strongly acid; gradual wavy boundary.

C—65 to 80 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; strongly acid.

The thickness of the solum is 30 to 70 inches. Reaction is extremely acid to slightly acid.

Some pedons have an Oe horizon that blends into a mass of roots in the upper few inches of the A horizon. The Oe horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or is neutral in hue and has value of 2. It is as much as 7 inches thick.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. Gray or light gray mottles are in some pedons. This horizon is 2 to 15 inches thick.

The Bh horizon has hue of 10YR, value of 2 or 3, and chroma of 1; hue of 7.5YR, value of 3 or 4, and chroma of 2; or hue of 5YR, value of 2 or 3, and chroma of 1 or 2. Gray or light gray mottles are in some pedons. This horizon is 10 to 45 inches thick. The BC horizon has hue of 10YR, value of 4 to 7, and chroma of 3 or 4. It is 5 to 20 inches thick.

The C horizon to a depth of 80 inches or more has hue of 10YR, value of 4 to 7, and chroma of 1 or 2.

Formation of the Soils

In this section, the factors of soil formation are described and related to the soils in Nassau County. The processes of horizon differentiation are also explained.

Factors of Soil Formation

The kind of soil that develops in an area depends on five major factors. These factors are the physical and mineral composition of the parent material; the climate under which the soil material has accumulated and has existed since accumulation; the organisms, or plant and animal life on and in the soil; the relief, or lay of the land; and the length of time that these factors have acted on the soil material. All of these factors affect the formation of each soil, but the relative importance of each factor differs from place to place. In some areas one factor may dominate in the formation of a soil and determine most of the soil properties. For example, if the parent material consists of pure quartz sand, which is highly resistant to weathering, the soil generally has weakly expressed horizons. Even in quartz sand, however, a distinct profile can be formed under certain types of vegetation if the relief is low and flat and the water table is high.

The interrelationship among these five factors is complex, and the effects of any one factor cannot be isolated and completely evaluated. Each factor is described separately, and the probable effects of each are indicated.

Parent Material

The parent material of the soils in Nassau County consists mostly of deposits of marine origin. These deposits are mostly quartz sand with varying amounts of clay and shell fragments. Clay is more abundant in soils that formed in the sediment on marine terraces and in lagoons. It is virtually absent on shoreline ridges where most deposits are eolian sand. The parent material was transported by ocean currents. The ocean covered the area a number of times during the Pleistocene age.

The parent material in the county differs somewhat in mineral and chemical composition and in physical structure. The main physical differences, such as those between sand, silt, and clay, can be observed in the field. Other differences, such as mineral and chemical composition, are important to soil formation and affect the present physical and chemical characteristics of the soils. Many differences among the soils in the county reflect original differences in the parent material as it was laid down.

Some organic soils are throughout the county. They formed in partly decayed wetland vegetation.

Climate

Climate, particularly temperature and rainfall, mainly determines the rate and nature of the physical, chemical, and biological processes that affect the weathering of soil material. Rainfall, changing temperature, wind, and sun help advance the breakdown of rocks and minerals, the release of chemicals, and other processes that affect the development of the soils. The amount of water that percolates through the soil depends on rainfall, relative humidity, soil permeability, and physiographic position. Temperature influences the kinds of organisms and their growth and the speed of physical and chemical reactions in the soils.

Nassau County has a warm, humid climate characterized by long, hot summers and short, mild winters. The soils generally are low in bases because most of the rainfall percolates downward through the soil. Because the rainfall generally is well distributed, most of the soils retain moisture throughout the year. Climate throughout the county is uniform; therefore, it has had about the same effect on soil development in all parts of the county. The soils in the county are mostly highly weathered, leached, strongly acid, and low in natural fertility and organic matter.

Plants and Animals

Plants, animals, and other organisms have a significant role in soil development. Plant and animal life can increase the content of organic matter and nitrogen, increase or decrease plant nutrients, and change the structure and porosity of the soils.

Plants recycle plant nutrients, accumulate organic matter, and provide food and cover for animal life. They stabilize the surface layer so that soil-forming processes can continue. Vegetation also provides a more stable environment for soil-forming processes by protecting the soil from extremes in temperature.

The soils in the county formed under a succession of plants. This succession is still evident in the smooth cordgrass and black rush in the marshlands; the big cordgrass and giant cutgrass in the brackish water areas; the hardwood trees and cypress in the very poorly drained areas; and the pine trees in the moderately well drained and poorly drained areas.

Animals rearrange soil material by roughening the soil surface, forming and filling channels, and shaping the peds and voids. The soil is mixed by the channeling of ants, wasps, worms, and spiders and the burrowing of crustacea, such as crabs and crawfish, turtles, and other reptiles. Bacteria, fungi, and other microorganisms hasten decomposition of organic matter and increase the release of minerals for additional plant growth. Humans affect the soil-forming process by tilling the soil for agriculture, removing natural vegetation and establishing other plants, and reducing or increasing the fertility of the soil.

The net gains and losses caused by plants and animals in the soil-forming process are important in the county. The fiddler crab and other crustacea continuously burrow and rework the upper horizons of Tisonia soils. Plant residue provides most of the organic matter for the formation of the umbric epipedon in Buccaneer and Rutlege soils. Plants recycle the calcium in Meggett soils and provide the stability necessary for the formation of the ochric epipedon.

Relief

Relief, or lay of the land, affects soil formation because it influences microclimate and water relationships. Soil temperature is influenced by altitude and by the orientation of slopes toward or away from the sun. Relief controls drainage, runoff, erosion, soil fertility, and vegetation. Soil formation is retarded on steep slopes because soil material and organic matter tend to gravitate downslope.

Even though the terrain of Nassau County is mostly nearly level, relief has a significant effect on the soils. The soils are sandy because the parent material of most of the soils consists of sandy marine deposits. Because sandy soils have low available water capacity and easily become droughty, most of the water available to plants comes from the water table. As a result, the depth to the water table becomes extremely important in determining the type of vegetation that grows in a particular area.

The depth to the water table also affects internal drainage. On the sand ridges, where the water table is deep and the soils are highly leached, soluble plant nutrients and colloidal clays and organic matter are carried rapidly downward to the sandy soil.

In flatwood areas the water table is commonly at or near the surface and rarely drops below a depth of 5 feet. Organic matter is translocated down a short distance and forms a humus-rich spodic horizon, or Bh horizon. This horizon is referred to locally as a hardpan.

In low areas or depressions, where the water table is generally above the surface, muck accumulates under the marsh or swamp vegetation. As these plants die the residue accumulates in the water where oxygen is excluded, and it slowly and only partly decays. The amount of muck that accumulates depends mainly on the depth and duration of standing water. In some wet areas accumulations of organic matter have formed a thick black topsoil on the mineral soil instead of a muck surface layer.

Time

Time is an important factor in soil formation. The physical and chemical changes brought about by climate, plants and animals, and relief are slow. The length of time needed to convert raw, geologic material into soil varies according to the nature of the geologic material and the interaction of the other factors. Some basic minerals from which soils are formed weather fairly rapidly, while other minerals are chemically inert and show little change over long periods. The translocation of fine particles in the soil to form horizons varies under different conditions, but the processes always take a relatively long time.

In Nassau County the dominant geologic materials are inert. The sand is almost pure quartz and is highly resistant to weathering. The finer textured silt and clay are the products of earlier weathering.

Relatively little geologic time has elapsed since the material in which the soils in the county developed was laid down or emerged from the sea. The loamy and clayey horizons formed in place through processes of clay translocation.

Processes of Horizon Differentiation

Soil morphology refers to the process that involves the formation of the soil horizon or soil horizon differentiation. The differentiation of horizons in soils in Nassau County is the accumulation of organic matter, leaching of carbonates, reduction and transfer of iron, or accumulation of silicate clay minerals. In the formation of most soils, more than one of these processes is involved.

Some organic matter has accumulated in the upper layers of most of the soils to form an A horizon. The content of organic matter is low in some of the soils and fairly high in others.

Carbonates and salts have been leached in most of the soils. Because the leaching permitted the subsequent translocation of silicate clay material in some soils, the effects of leaching have been indirect. Most of the soils in the county are leached to varying degrees.

The process of chemical reduction, or gleying, is evident in many of the soils in the county except in the excessively drained soils. Gleying is caused by wetness. The gray matrix color in the B horizon in many soils and the grayish mottles in other soils indicate the reduction of iron. In some horizons reddish brown mottles and concretions indicate the segregation of iron and a fluctuating water table.

The translocation of silicate clay, colloidal organic matter, and iron oxides has contributed to horizon development in many of the soils in the county. The movement of clay, organic matter, or iron is evident in many of the soils; for example, in a leached E horizon that is light in color, in a Bt or Bh horizon in which sand grains are bridged and coated with clay or colloidal organic matter, in a few patchy clay films on faces of peds, and in root channels. Other processes of soil formation are less important in the formation of horizons in the soils of Nassau County than in the translocation of silicate clay.

References

(1) American Association of State Highway and Transportation Officials. 1982. Standard specifications for highway materials and methods of sampling and testing. Ed. 13, 2 vols., illus.

(2) American Society for Testing and Materials. 1985. Standard test method for classification of soils for engineering purposes. ASTM Stand. D 2487.

(3) Barns, Robert L. 1955. Growth and yield of slash pine plantations in Florida. Univ. Fla. Res. Rep. No. 3, illus.

(4) Bartels, Jay M. Isle of eight flags—Exciting history of Fernandina Beach as a part of American folklore. Hist. Soc. of Amelia Island. Leafl.

(5) Bishop, E.W., and L.L. Dee. 1961. Rocks and minerals of Florida, a guide to identification, occurrence, production and use. Fla. Bur. Geol., Spec. Publ. No. 8, 41 pp., illus.

(6) Chen, C.S. 1965. The regional lithostratigraphic analysis of Paleocene and Eocene rock of Florida. Fla. Bur. Geol., Bull. 45, 105 pp.

(7) Coile, T.S., and Schumacher, F.X. 1960. Growth and yield of natural stands of southern pines. U.S. Dep. Agric., Misc. Publ. 50, 202 pp., illus.

(8) Doolittle, J.A. 1982. Characterizing soil map units with the ground-penetrating radar. Soil Surv. Horiz. 23: 3-10, illus.

(9) Doolittle, J.A. 1983. Investigating Histosols with the ground-penetrating radar. Soil Surv. Horiz. 23: 23-28, illus.

(10) Johnson, R.W., R. Glaccum, and R. Wojtasinski. 1979. Application of ground-penetrating radar to soil survey. Proc. Soil and Crop Sci. Soc. of Fla. 39: 68-72, illus. (Reprinted in Soil Survey Horizons 23: 17-25)

(11) Pirkle, E.C., W.A. Pirkle, and W.H. Yoho. 1974. The Green Cove Springs and Boulogne heavy mineral sand deposits of Florida. Econ. Geol., vol. 69, pp. 1129-1137.

(12) Shih, S.F., and J.A. Doolittle. 1984. Using radar to investigate organic soil thickness in the Florida Everglades. Soil Sci. Soc. of Amer. 48: 651-656, illus.

(13) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus. (Supplements replacing pp. 173-188 issued May 1962.)

(14) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436, 754 pp., illus.

(15) United States Department of Agriculture. 1984. Procedures for collecting soil samples and methods of analysis for soil survey. Soil Surv. Invest. Rep. 1, 68 pp., illus.

(16) United States Department of Agriculture. 1985. Site index and yield of second growth baldcypress. Soil Conserv. Serv., Tech. Note No. 15, 2 pp.

(17) United States Department of Commerce, National Oceanic and Atmospheric Administration. 1964. Climatography of the United States No. 86-6, climatic summary of the United States—supplement for 1951 through 1960, Florida. 61 pp., illus.

(18) United States Department of Commerce, National Oceanic and Atmospheric Administration. 1972. Climatography of the United States No. 60-8, climate of Florida. 31 pp., illus.

(19) United States Department of Commerce, National Oceanic and Atmospheric Administration. 1973. Local climatological data, annual summary with comparative data, Jacksonville, Florida, 1973. 4 pp., illus.

(20) White, William A. 1970. The geomorphology of the Florida peninsula. Fla. Dep. Natur. Resour., Bur. of Geol., Bull. 51, 164 pp., illus.

Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. The capacity, in inches of water per inch of soil, is expressed as—

Very low	0 to 0.05
Low	0.05 to 0.10
Moderate	0.10 to 0.15
High	0.15 to 0.20
Very high	more than 0.20

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but that have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels, i.e., clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods.

Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, such as fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess sodium (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Excess sulfur (in tables). Excessive amount of sulfur in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flatwoods. Broad, nearly level, poorly drained areas characteristically vegetated with open woods of pine, saw palmetto, gallberry, and pineland threeawn.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Forb. Any herbaceous plant that is not a grass or sedge.

Fragile (in tables). The soil is easily damaged by use or disturbance.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants follow disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Sprinkler.—Water is sprayed over the soil surface to pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches

Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending to all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are—

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Salty water (in tables). Water is too salty for consumption by livestock.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. Designation of the quality of a forest site based on the height of the dominant or codominant trees in even-aged, unmanaged stands at the index age of 50 years. For example, if the average height attained by dominant or codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Site quality. Designation of the quality of a forest site based on the height of the dominant or codominant trees in even-aged, managed pine plantations at the index age of 25 years. For example, if the average height attained by dominant or codominant trees in a fully stocked stand at the age of 25 years is 60 feet, the site quality is 60 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinders establishment of vegetation or severely restricts plant growth.

Trace elements. Chemical elements, such as zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded during the period 1941-70 at Jacksonville International Airport]

Month	Temperature					Precipitation				
	Monthly normal mean	Normal daily maximum	Normal daily minimum	Mean number of days with temperature		Normal total	Maximum total	Minimum total	Mean number of days with rainfall of--	
				90 °F or higher	32 °F or lower				0.10 inch or more	0.50 inch or more
	°F	°F	°F			In	In	In		
January----	54.6	64.6	44.5	0	4	2.78	7.29	0.06	4	2
February---	56.3	66.9	45.7	0	3	3.58	8.85	.52	6	2
March------	61.2	72.2	50.1	0	1	3.56	10.18	.18	5	3
April------	68.1	79.0	57.1	2	0	3.07	11.61	.17	4	2
May--------	74.3	84.6	63.9	9	0	3.22	10.43	.61	5	2
June-------	79.2	88.3	70.0	17	0	6.27	12.90	2.19	7	3
July-------	81.0	90.0	72.0	24	0	7.35	16.21	2.71	11	5
August-----	81.0	89.7	72.3	21	0	7.89	16.24	1.92	7	4
September--	78.2	86.0	70.4	10	0	7.83	19.36	1.02	10	5
October----	70.5	79.2	61.7	1	0	4.54	13.44	.16	6	4
November---	61.2	71.4	51.0	0	1	1.79	7.85	Trace	2	1
December---	55.4	65.6	45.1	0	3	2.59	7.09	.04	3	2
Year-----	68.4	78.1	58.7	84	12	54.47	*82.27	*31.76	70	35

* Maximum total in 1947 and minimum total in 1954.

TABLE 2.--FREEZE DATA

[Recorded at Jacksonville International Airport]

Freeze threshold temperature	Mean date of last spring occurrence	Mean date of first fall occurrence	Mean number of days between dates	Number of occurrences in spring in 30 years	Number of occurrences in fall in 30 years
°F					
32	Feb. 6	Dec. 16	313	24	15
28	Jan. 22	Dec. 21	336	17	11
24	Jan. 6	Dec. 28	356	8	5
20	*	*	*	2	0
16	*	*	*	0	0

* Frequency of occurrence in either spring or fall is 1 year or less in 10.

TABLE 3.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
2	Arents, nearly level	630	0.2
3	Beaches	847	0.2
4	Echaw fine sand	497	0.1
5	Fripp fine sand, rolling	970	0.2
6	Hurricane-Pottsburg fine sands, 0 to 5 percent slopes	14,652	3.5
7	Kingsland mucky peat, frequently flooded	4,937	1.2
8	Kureb fine sand, 0 to 5 percent slopes	597	0.1
9	Leon fine sand	42,802	10.4
10	Mandarin fine sand	3,467	0.8
11	Chaires fine sand	23,335	5.6
12	Newhan-Corolla, rarely flooded, fine sands, rolling	747	0.2
13	Goldhead fine sand	54,567	13.2
14	Rutlege mucky fine sand, frequently flooded	8,637	2.1
15	Buccaneer clay, frequently flooded	28,553	7.0
16	Ellabelle mucky fine sand, frequently flooded	15,033	3.7
17	Urban land	482	0.1
18	Lynn Haven-Wesconnett-Leon complex, depressional	969	0.2
19	Leon fine sand, tidal	1,114	0.3
20	Ortega fine sand, 0 to 5 percent slopes	4,922	1.2
21	Blanton fine sand, 0 to 5 percent slopes	2,029	0.5
22	Sapelo-Leon fine sands	12,616	3.0
23	Ocilla fine sand, 0 to 5 percent slopes	2,494	0.6
24	Kingsferry fine sand	17,621	4.2
25	Maurepas muck, frequently flooded	4,557	1.1
26	Centenary fine sand, 0 to 5 percent slopes	1,737	0.4
27	Ridgewood fine sand, 0 to 5 percent slopes	7,727	1.9
28	Tisonia mucky peat, frequently flooded	27,373	6.6
29	Resota fine sand, 0 to 5 percent slopes	438	0.1
30	Kureb-Resota fine sands, rolling	1,148	0.3
31	Kershaw fine sand, 2 to 8 percent slopes	974	0.2
32	Aqualfs, loamy	569	0.1
33	Goldhead-Meadowbrook fine sands, depressional	15,784	3.8
34	Croatan muck, frequently flooded	3,222	0.8
36	Boulogne fine sand	33,731	8.1
37	Meggett loamy fine sand	24,934	6.0
38	Meggett fine sandy loam, rarely flooded	4,835	1.2
39	Evergreen-Leon mucks, depressional	13,601	3.3
40	Brookman mucky fine sandy loam, depressional	1,798	0.4
44	Corolla fine sand, 2 to 6 percent slopes, rarely flooded	604	0.1
45	Meggett loamy fine sand, depressional	1,369	0.3
46	Buccaneer clay, rarely flooded	965	0.2
47	Leefield fine sand, 0 to 5 percent slopes	1,487	0.4
49	Ousley and Mandarin fine sands, occasionally flooded	1,412	0.3
50	Blanton fine sand, 12 to 20 percent slopes	488	0.1
51	Albany fine sand, 0 to 5 percent slopes	8,324	2.0
52	Osier loamy fine sand, frequently flooded	2,088	0.5
53	Meadowbrook fine sand	4,341	1.0
54	Sapelo fine sand	4,217	1.0
55	Meadowbrook-Goldhead-Meggett complex, 2 to 5 percent slopes	2,215	0.5
56	Blanton-Ortega fine sands, 5 to 12 percent slopes	808	0.2
57	Penney fine sand, 0 to 5 percent slopes	1,234	0.3
	Water areas less than 40 acres in size	888	0.2
	Total	415,386	100.0

TABLE 4.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Land capability	Corn	Bahiagrass	Grain sorghum	Improved bermudagrass
		Bu	AUM*	Bu	AUM*
2. Arents					
3. Beaches					
4------------------------ Echaw	IIIs	---	7.5	---	3.5
5------------------------ Fripp	VIIs	---	---	---	---
6------------------------ Hurricane-Pottsburg	IIIw	65	7.0	35	7.0
7------------------------ Kingsland	VIIw	---	---	---	---
8------------------------ Kureb	VIIs	---	---	---	---
9------------------------ Leon	IVw	50	7.5	35	6.5
10----------------------- Mandarin	VIs	40	6.0	30	3.5
11----------------------- Chaires	IVw	50	8.0	35	6.5
12----------------------- Newhan-Corolla	VIIIs	---	---	---	---
13----------------------- Goldhead	IIIw	50	8.0	30	6.5
14----------------------- Rutlege	VIw	---	---	---	---
15----------------------- Buccaneer	VIw	---	---	---	---
16----------------------- Ellabelle	Vw	---	---	---	---
17. Urban land					
18----------------------- Lynn Haven-Wesconnett-Leon	VIIw	---	---	---	---
19----------------------- Leon	VIIIw	---	---	---	---

See footnote at end of table.

TABLE 4.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Corn	Bahiagrass	Grain sorghum	Improved bermudagrass
		Bu	AUM*	Bu	AUM*
20----------------------- Ortega	IIIs	55	6.0	25	4.5
21----------------------- Blanton	IIIs	60	7.0	25	5.0
22----------------------- Sapelo-Leon	IVw	50	7.5	35	6.5
23----------------------- Ocilla	IIIw	75	7.5	35	7.0
24----------------------- Kingsferry	IVw	55	7.5	50	5.5
25----------------------- Maurepas	VIIIw	---	---	---	---
26----------------------- Centenary	IIIs	60	6.0	25	4.5
27----------------------- Ridgewood	IVs	55	7.0	30	4.5
28----------------------- Tisonia	VIIIw	---	---	---	---
29----------------------- Resota	VIs	---	5.0	---	---
30----------------------- Kureb-Resota	VIIs	---	---	---	---
31----------------------- Kershaw	VIIs	---	3.5	---	3.5
32. Aqualfs					
33----------------------- Goldhead-Meadowbrook	VIIw	---	---	---	---
34----------------------- Croatan	VIIw	---	---	---	---
36----------------------- Boulogne	IIIw	70	8.0	55	7.0
37, 38------------------- Meggett	IVw	75	8.0	45	6.5
39----------------------- Evergreen-Leon	VIIw	---	---	---	---
40----------------------- Brookman	VIIw	---	---	---	---
44----------------------- Corolla	VIIs	---	---	---	---

See footnote at end of table.

TABLE 4.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Corn	Bahiagrass	Grain sorghum	Improved bermudagrass
		Bu	AUM*	Bu	AUM*
45------------------------ Meggett	VIIw	---	---	---	---
46------------------------ Buccaneer	IIIw	90	8.5	55	5.5
47------------------------ Leefield	IIw	70	8.0	35	6.5
49------------------------ Ousley and Mandarin	IIIw	70	7.0	30	4.5
50------------------------ Blanton	VIs	60	7.5	---	---
51------------------------ Albany	IIIw	75	7.0	30	6.5
52------------------------ Osier	Vw	---	---	---	---
53------------------------ Meadowbrook	IVw	50	7.5	30	6.5
54------------------------ Sapelo	IVw	50	7.5	35	6.5
55------------------------ Meadowbrook-Goldhead-Meggett	IVw	---	6.0	30	6.0
56------------------------ Blanton-Ortega	IVs	60	7.5	---	---
57------------------------ Penney	IVs	35	4.0	---	4.5

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity				Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	25-year site quality*	50-year site index*	Cords per acre*	
4 Echaw	5S	Slight	Moderate	Moderate	Slight	Slight	Longleaf pine	---	60	30	Longleaf pine, slash pine.
							Slash pine	50	---	18	
							Live oak	---	---	---	
							Water oak	---	---	---	
6: Hurricane	11W	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	65	---	34	Slash pine, loblolly pine, longleaf pine.
							Longleaf pine	---	75	49	
							Loblolly pine	65	---	42	
							Turkey oak	---	---	---	
							Live oak	---	---	---	
Pottsburg	8W	Slight	Moderate	Moderate	Moderate	Severe	Slash pine	60	---	28	Slash pine, loblolly pine, longleaf pine.
							Longleaf pine	---	70	43	
							Loblolly pine	60	---	36	
							Water oak	---	---	---	
8 Kureb	3S	Slight	Severe	Severe	Slight	Slight	Longleaf pine	---	40	10	Longleaf pine, sand pine.
							Sand pine	---	70	30	
							Live oak	---	---	---	
							Water oak	---	---	---	
9 Leon	8W	Slight	Moderate	Moderate	Moderate	Severe	Slash pine	55	---	23	Slash pine, loblolly pine, longleaf pine.
							Longleaf pine	---	65	36	
							Loblolly pine	55	---	31	
10 Mandarin	8S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	55	---	23	Slash pine, loblolly pine, longleaf pine.
							Longleaf pine	---	60	30	
							Loblolly pine	55	---	31	
							Live oak	---	---	---	
11 Chaires	10W	Slight	Moderate	Moderate	Slight	Severe	Slash pine	60	---	28	Slash pine, loblolly pine, longleaf pine.
							Loblolly pine	60	---	36	
							Longleaf pine	---	70	43	
							Water oak	---	---	---	
13 Goldhead	11W	Slight	Severe	Severe	Slight	Severe	Slash pine	65	---	34	Slash pine, loblolly pine, longleaf pine.
							Loblolly pine	65	---	42	
							Longleaf pine	---	75	49	
							Sweetgum	---	---	---	
							Water oak	---	---	---	
							Blackgum	---	---	---	

See footnote at end of table.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity				Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	25-year site quality*	50-year site index*	Cords per acre*	
20 Ortega	10S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	55	---	23	Slash pine, longleaf pine, loblolly pine.
							Longleaf pine	---	60	30	
							Loblolly pine	55	---	31	
							Turkey oak	---	---	---	
							Live oak	---	---	---	
21 Blanton	11S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	55	---	23	Slash pine, loblolly pine, longleaf pine.
							Loblolly pine	55	---	31	
							Longleaf pine	---	65	36	
							Live oak	---	---	---	
							Water oak	---	---	---	
							Turkey oak	---	---	---	
22: Sapelo	7W	Slight	Moderate	Moderate	Slight	Severe	Loblolly pine	60	---	36	Loblolly pine, slash pine, longleaf pine.
							Slash pine	60	---	28	
							Longleaf pine	---	70	43	
							Water oak	---	---	---	
Leon	8W	Slight	Moderate	Moderate	Moderate	Severe	Slash pine	55	---	23	Slash pine, loblolly pine, longleaf pine.
							Longleaf pine	---	65	36	
							Loblolly pine	55	---	31	
23 Ocilla	8W	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine	65	---	42	Loblolly pine, slash pine, longleaf pine.
							Slash pine	65	---	34	
							Longleaf pine	---	70	43	
							Turkey oak	---	---	---	
							Live oak	---	---	---	
26 Centenary	11S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	60	---	28	Slash pine, longleaf pine.
							Longleaf pine	---	70	43	
							Live oak	---	---	---	
							Turkey oak	---	---	---	
27 Ridgewood	8S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	60	---	28	Slash pine, longleaf pine.
							Longleaf pine	---	70	43	
							Bluejack oak	---	---	---	
							Turkey oak	---	---	---	
							Live oak	---	---	---	
29 Resota	8S	Slight	Moderate	Severe	Slight	Moderate	Slash pine	---	---	---	Slash pine, longleaf pine.
							Longleaf pine	---	65	36	
							Live oak	---	---	---	
30: Kureb	3S	Slight	Severe	Severe	Slight	Moderate	Longleaf pine	---	50	20	Longleaf pine.
							Sand pine	---	---	---	
							Live pine	---	---	---	

See footnote at end of table.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity				Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	25-year site quality*	50-year site index*	Cords per acre*	
30: Resota	8S	Slight	Moderate	Severe	Slight	Moderate	Slash pine	---	---	---	Longleaf pine.
							Longleaf pine	---	55	36	
							Live oak	---	---	---	
							Water oak	---	---	---	
31 Kershaw	8S	Slight	Severe	Severe	Slight	Moderate	Slash pine	40	---	11	Sand pine, longleaf pine, slash pine.
							Longleaf pine	---	55	24	
							Sand pine	---	75	34	
							Turkey oak	---	---	---	
							Live oak	---	---	---	
36 Boulogne	8W	Slight	Severe	Severe	Slight	Severe	Slash pine	70	---	47	Slash pine, loblolly pine.
							Loblolly pine	70	---	47	
							Water oak	---	---	---	
37 Meggett	9W	Slight	Severe	Severe	Slight	Severe	Slash pine	70	---	47	Loblolly pine, slash pine.
							Loblolly pine	65	---	34	
							Sweetgum	---	---	---	
38 Meggett	13W	Slight	Severe	Severe	Slight	Severe	Slash pine	70	---	41	Slash pine, loblolly pine.
							Loblolly pine	70	---	47	
							Cabbage palm	---	---	---	
							Red maple	---	---	---	
46 Buccaneer	13W	Slight	Severe	Severe	Severe	Severe	Slash pine	70	---	41	Loblolly pine, slash pine.
							Loblolly pine	75	---	53	
							Cabbage palm	---	---	---	
							Willow oak	---	---	---	
							Red maple	---	---	---	
47 Leefield	8W	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine	65	---	42	Loblolly pine, slash pine, longleaf pine.
							Slash pine	65	---	34	
							Longleaf pine	---	70	43	
							Turkey oak	---	---	---	
							Live oak	---	---	---	
49: Ousley	8W	Slight	Severe	Moderate	Slight	Moderate	Loblolly pine	50	---	26	Slash pine, loblolly pine, longleaf pine.
							Slash pine	50	---	18	
							Longleaf pine	---	60	30	
							Turkey oak	---	---	---	
							Post oak	---	---	---	
							Live oak	---	---	---	

See footnote at end of table.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity				Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	25-year site quality*	50-year site index*	Cords per acre*	
49: Mandarin-------	8S	Slight	Moderate	Severe	Slight	Moderate	Slash pine--------- Longleaf pine------ Loblolly pine------ Live oak-----------	55 --- 55 ---	--- 60 --- ---	23 30 31 ---	
50------------- Blanton	11S	Moderate	Moderate	Moderate	Slight	Moderate	Slash pine--------- Loblolly pine------ Longleaf pine------ Water oak---------- Turkey oak---------	55 55 --- --- ---	--- --- 65 --- ---	23 31 36 --- ---	Slash pine, loblolly pine, longleaf pine.
51------------- Albany	9W	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine------ Slash pine--------- Longleaf pine------ Turkey oak--------- Live oak-----------	60 60 --- --- ---	--- --- 70 --- ---	36 28 43 --- ---	Loblolly pine, slash pine, longleaf pine.
53------------- Meadowbrook	7W	Slight	Severe	Severe	Slight	Severe	Loblolly pine------ Slash pine--------- Longleaf pine------ Blackgum----------- Water oak---------- Sweetgum-----------	60 60 --- --- --- ---	--- --- 70 --- --- ---	36 28 43 --- --- ---	Loblolly pine, slash pine, longleaf pine.
54------------- Sapelo	7W	Slight	Moderate	Moderate	Slight	Severe	Loblolly pine------ Slash pine--------- Longleaf pine------ Water oak----------	60 60 --- ---	--- --- 70 ---	36 28 43 ---	Loblolly pine, slash pine, longleaf pine.
56: Blanton--------	11S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine--------- Loblolly pine------ Longleaf pine------ Water oak---------- Turkey oak---------	55 55 --- --- ---	--- --- 65 --- ---	23 31 36 --- ---	Slash pine, loblolly pine, longleaf pine.
Ortega---------	10S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine--------- Longleaf pine------ Water oak---------- Turkey oak---------	55 --- --- ---	--- 65 --- ---	23 36 --- ---	Slash pine, longleaf pine.

See footnote at end of table.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity				Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	25-year site quality*	50-year site index*	Cords per acre*	
57-------------- Penney	8S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine---------	50	---	18	Sand pine, longleaf pine.
							Longleaf pine------	---	70	43	
							Sand pine----------	---	80	38	
							Turkey oak---------	---	---	---	
							Bluejack oak-------	---	---	---	
							Water oak----------	---	---	---	
							Live oak-----------	---	---	---	

* Site quality, site index, and cords per acre values are averages of potential tree growth on a given soil. Management practices and soil series variability can alter these values. Thus, site quality, site index, and cords per acre values should be used as a guide in choosing the best soils for woodland management.

TABLE 6.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "moderate" and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
2. Arents					
3. Beaches					
4 Echaw	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
5 Fripp	Severe: flooding, too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.
6:					
Hurricane	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Pottsburg	Severe: wetness, too sandy.	Severe: too sandy.	Severe: too sandy, wetness.	Severe: too sandy.	Severe: droughty.
7 Kingsland	Severe: excess humus, flooding, wetness.	Severe: excess humus, wetness.	Severe: excess humus, wetness, flooding.	Severe: excess humus, wetness.	Severe: wetness, flooding, excess humus.
8 Kureb	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
9 Leon	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
10 Mandarin	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: wetness, droughty.
11 Chaires	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
12:					
Newhan	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.
Corolla	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
13 Goldhead	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
14 Rutlege	Severe: flooding, too sandy.	Severe: flooding, too sandy.	Severe: too sandy, flooding.	Severe: ponding, flooding.	Severe: flooding.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
15-------------------- Buccaneer	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness, too clayey.	Severe: wetness, too clayey, flooding.	Severe: wetness, too clayey, flooding.	Severe: wetness, too clayey, flooding.
16-------------------- Ellabelle	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.
17. Urban land					
18:					
Lynn Haven-----------	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
Wesconnett-----------	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
Leon-----------------	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
19-------------------- Leon	Severe: flooding, wetness, too sandy.	Severe: flooding, wetness, too sandy.	Severe: too sandy, flooding.	Severe: flooding, wetness, too sandy.	Severe: excess salt, wetness, flooding.
20-------------------- Ortega	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
21-------------------- Blanton	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: flooding.
22:					
Sapelo---------------	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: droughty, wetness.
Leon-----------------	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
23-------------------- Ocilla	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: wetness, droughty, too sandy.
24-------------------- Kingsferry	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
25-------------------- Maurepas	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: ponding, flooding, excess humus.
26-------------------- Centenary	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
27-------------------- Ridgewood	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
28-------------------- Tisonia	Severe: flooding, wetness, percs slowly.	Severe: wetness, excess humus, excess salt.	Severe: excess humus, wetness, flooding.	Severe: wetness, excess humus.	Severe: excess salt, excess sulfur, wetness.
29-------------------- Resota	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
30:					
Kureb----------------	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.
Resota---------------	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.
31-------------------- Kershaw	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
32. Aqualfs					
33:					
Goldhead-------------	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding, droughty.
Meadowbrook----------	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding, droughty.
34-------------------- Croatan	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus, too acid.	Severe: excess humus, wetness, flooding.	Severe: wetness, excess humus.	Severe: too acid, wetness, flooding.
36-------------------- Boulogne	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
37-------------------- Meggett	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
38-------------------- Meggett	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
39:					
Evergreen------------	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
Leon-----------------	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
40-------------------- Brookman	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
44 Corolla	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
45 Meggett	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
46 Buccaneer	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness, percs slowly.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
47 Leefield	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: wetness, droughty.
49:					
Ousley	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Mandarin	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy, flooding.	Severe: too sandy.	Severe: droughty.
50 Blanton	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty, slope.
51 Albany	Severe: wetness.	Severe: too sandy.	Severe: too sandy, wetness.	Severe: too sandy.	Severe: droughty.
52 Osier	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
53 Meadowbrook	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
54 Sapelo	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: droughty, wetness.
55:					
Meadowbrook	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
Goldhead	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, droughty.
Meggett	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
56:					
Blanton	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.

TABLE 6.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
56:					
Ortega----------------	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.
57-------------------- Penney	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.

TABLE 7.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
2. Arents										
3. Beaches										
4 Echaw	Poor	Fair	Good	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
5 Fripp	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
6: Hurricane	Poor	Poor	Fair	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
Pottsburg	Poor	Poor	Fair	Poor	Poor	Poor	Poor	Poor	Poor	Poor.
7 Kingsland	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
8 Kureb	Very poor.	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.
9 Leon	Poor	Fair	Good	Poor	Fair	Fair	Poor	Fair	Fair	Poor.
10 Mandarin	Very poor.	Poor	Poor	Poor	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.
11 Chaires	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair.
12: Newhan	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Corolla	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
13 Goldhead	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Poor.
14 Rutlege	Very poor.	Poor	Poor	Poor	Poor	Fair	Good	Poor	Poor	Fair.
15 Buccaneer	Very poor.	Poor	Poor	Fair	Poor	Good	Good	Poor	Poor	Good.
16 Ellabelle	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
17. Urban land										

TABLE 7.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
18:										
Lynn Haven	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Fair	Good	Very poor.	Very poor.	Good.
Wesconnett	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Fair	Good	Very poor.	Very poor.	Good.
Leon	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
19 Leon	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Fair.
20 Ortega	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
21 Blanton	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
22:										
Sapelo	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair.
Leon	Poor	Fair	Good	Poor	Fair	Fair	Poor	Fair	Fair	Poor.
23 Ocilla	Fair	Fair	Good	Fair	Good	Fair	Fair	Fair	Good	Fair.
24 Kingsferry	Very poor.	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair.
25 Maurepas	Very poor.	Very poor.	Very poor.	Very poor.	---	Fair	Very poor.	Very poor.	Very poor.	Fair.
26 Centenary	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
27 Ridgewood	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
28 Tisonia	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Fair	Very poor.	Very poor.	Poor.
29 Resota	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
30:										
Kureb	Very poor.	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Resota	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
31 Kershaw	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
32. Aqualfs										
33:										
Goldhead	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Fair	Good	Very poor.	Very poor.	Good.

TABLE 7.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
33:										
Meadowbrook	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Fair	Good	Very poor.	Very poor.	Good.
34 Croatan	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
36 Boulogne	Poor	Fair	Fair	Poor	Fair	Fair	Poor	Fair	Fair	Poor.
37, 38 Meggett	Poor	Fair	Good	Fair	Good	Good	Good	Fair	Good	Good.
39:										
Evergreen	Very poor.	Poor	Poor	Very poor.	Very poor.	Good	Good	Poor	Poor	Good.
Leon	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
40 Brookman	Very poor.	Very poor.	Very poor.	Poor	Poor	Fair	Good	Very poor.	Very poor.	Good.
44 Corolla	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.
45 Meggett	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Fair	Good	Very poor.	Very poor.	Good.
46 Buccaneer	Poor	Fair	Fair	Fair	Fair	Good	Fair	Poor	Fair	Good.
47 Leefield	Fair	Fair	Good	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
49:										
Ousley	Poor	Fair	Good	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
Mandarin	Very poor.	Poor	Poor	Poor	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.
50 Blanton	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
51 Albany	Fair	Fair	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Poor.
52 Osier	Very poor.	Poor	Fair	Fair	Fair	Fair	Good	Poor	Fair	Fair.
53 Meadowbrook	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
54 Sapelo	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair.
55:										
Meadowbrook	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
Goldhead.										

TABLE 7.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
55:										
Meggett	Poor	Fair	Good	Fair	Good	Good	Good	Fair	Good	Good.
56:										
Blanton	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Ortega	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
57 Penney	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.

TABLE 8.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
2. Arents						
3. Beaches						
4 Echaw	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Severe: droughty.
5 Fripp	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Moderate: flooding, slope.	Severe: droughty.
6: Hurricane	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
Pottsburg	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: droughty.
7 Kingsland	Severe: excess humus, wetness.	Severe: flooding, subsides, wetness.	Severe: flooding, subsides, wetness.	Severe: flooding, subsides, wetness.	Severe: flooding, subsides, wetness.	Severe: wetness, flooding, excess humus.
8 Kureb	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: droughty.
9 Leon	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
10 Mandarin	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
11 Chaires	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
12: Newhan	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
Corolla	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: flooding, wetness.	Severe: droughty.
13 Goldhead	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
14 Rutlege	Severe: cutbanks cave, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
15 Buccaneer	Severe: too clayey, wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness, flooding, too clayey.
16 Ellabelle	Severe: cutbanks cave, flooding.	Severe: wetness, flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.
17. Urban land						
18:						
Lynn Haven	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Wesconnett	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Leon	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, excess humus.
19 Leon	Severe: cutbanks cave, wetness, flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: excess salt, wetness, flooding.
20 Ortega	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Severe: droughty.
21 Blanton	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Severe: droughty.
22:						
Sapelo	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: droughty, wetness.
Leon	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
23 Ocilla	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, droughty, too sandy.
24 Kingsferry	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
25 Maurepas	Severe: excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding, low strength.	Severe: ponding, flooding.	Severe: ponding, flooding, excess humus.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
26 Centenary	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Severe: droughty.
27 Ridgewood	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: droughty.
28 Tisonia	Severe: wetness.	Severe: subsides, flooding, wetness.	Severe: flooding, wetness, subsides.	Severe: subsides, flooding, wetness.	Severe: subsides, shrink-swell, low strength.	Severe: excess salt, excess sulfur, wetness.
29 Resota	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Severe: droughty.
30: Kureb	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
Resota	Severe: cutbanks cave.	Slight	Moderate: wetness.	Moderate: slope.	Slight	Severe: droughty.
31 Kershaw	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: droughty.
32. Aqualfs						
33: Goldhead	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty.
Meadowbrook	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty.
34 Croatan	Severe: excess humus, wetness.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness.	Severe: flooding, wetness, low strength.	Severe: wetness, flooding.	Severe: too acid, wetness, flooding.
36 Boulogne	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
37 Meggett	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, wetness.	Severe: wetness.
38 Meggett	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, wetness.	Severe: wetness.
39: Evergreen	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, excess humus.
Leon	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, excess humus.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
40---------------- Brookman	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding.	Severe: ponding.
44---------------- Corolla	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: flooding, wetness.	Severe: droughty.
45---------------- Meggett	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
46---------------- Buccaneer	Severe: too clayey, wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness, too clayey.
47---------------- Leefield	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
49:						
Ousley-----------	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Severe: droughty.
Mandarin---------	Severe: cutbanks cave, wetness, flooding.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Severe: droughty.
50---------------- Blanton	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
51---------------- Albany	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Severe: droughty.
52---------------- Osier	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, droughty.
53---------------- Meadowbrook	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
54---------------- Sapelo	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: droughty, wetness.
55:						
Meadowbrook------	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
Goldhead---------	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
55:						
Meggett----------	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, wetness.	Severe: wetness.
56:						
Blanton----------	Severe: cutbanks cave.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
Ortega-----------	Severe: cutbanks cave.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
57---------------- Penney	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Severe: droughty.

TABLE 9.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "poor," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
4------------------ Echaw	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy.
5------------------ Fripp	Severe: poor filter.	Severe: seepage, flooding, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
6:					
Hurricane----------	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, seepage, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
Pottsburg----------	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: wetness, seepage.	Poor: too sandy, wetness, seepage.
7------------------ Kingsland	Severe: flooding, wetness, subsides.	Severe: flooding, seepage, excess humus.	Severe: flooding, wetness, seepage.	Severe: flooding, seepage, wetness.	Poor: excess humus, wetness.
8------------------ Kureb	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy.
9------------------ Leon	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
10----------------- Mandarin	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: wetness, seepage.	Poor: seepage, too sandy.
11----------------- Chaires	Severe: wetness, percs slowly.	Severe: seepage.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
12:					
Newhan------------	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Corolla------------	Severe: wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: wetness, seepage.	Severe: seepage, wetness.	Poor: seepage, too sandy.

TABLE 9.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
13 Goldhead	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
14 Rutlege	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: seepage, flooding, too sandy.	Severe: seepage, flooding.	Poor: seepage, too sandy, flooding.
15 Buccaneer	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Poor: too clayey, hard to pack, wetness.
16 Ellabelle	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness.
18: Lynn Haven	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
Wesconnett	Severe: ponding.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
Leon	Severe: ponding.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
19 Leon	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
20 Ortega	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
21 Blanton	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: too sandy.	Severe: seepage.	Poor: too sandy.
22: Sapelo	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Leon	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.

TABLE 9.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
23 Ocilla	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
24 Kingsferry	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
25 Maurepas	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding, excess humus.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: flooding, seepage, ponding.
26 Centenary	Severe: wetness, poor filter.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
27 Ridgewood	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
28 Tisonia	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding, excess humus.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
29 Resota	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
30:					
Kureb	Severe: poor filter.	Severe: seepage, slope.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Resota	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
31 Kershaw	Severe: poor filter.	Severe: seepage.	Severe: too sandy, seepage.	Severe: seepage.	Poor: seepage, too sandy.
33:					
Goldhead	Severe: ponding, percs slowly, poor filter.	Severe: seepage, ponding.	Severe: cemented pan, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
Meadowbrook	Severe: ponding, percs slowly, poor filter.	Severe: seepage, ponding.	Severe: ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
34 Croatan	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding, excess humus.	Severe: flooding, wetness, too acid.	Severe: flooding, seepage, wetness.	Poor: wetness, thin layer.

TABLE 9.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
36----------------- Boulogne	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
37, 38------------- Meggett	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
39:					
Evergreen----------	Severe: ponding.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
Leon---------------	Severe: ponding.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
40----------------- Brookman	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
44----------------- Corolla	Severe: wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: wetness, seepage.	Severe: seepage, wetness.	Poor: seepage, too sandy.
45----------------- Meggett	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
46----------------- Buccaneer	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
47----------------- Leefield	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
49:					
Ousley-------------	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy.
Mandarin-----------	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy.
50----------------- Blanton	Severe: wetness, poor filter, slope.	Severe: seepage, slope, wetness.	Severe: slope, too sandy.	Severe: seepage, slope.	Poor: too sandy, slope.

TABLE 9.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
51----------------- Albany	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness.
52----------------- Osier	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
53----------------- Meadowbrook	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
54----------------- Sapelo	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
55:					
Meadowbrook--------	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Goldhead-----------	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Meggett------------	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
56:					
Blanton------------	Severe: wetness, poor filter.	Severe: seepage, slope, wetness.	Severe: too sandy.	Severe: seepage.	Poor: too sandy.
Ortega-------------	Moderate: wetness.	Severe: seepage, slope.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
57----------------- Penney	Slight-----------	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.

TABLE 10.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
2. Arents				
3. Beaches				
4 Echaw	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
5 Fripp	Good	Probable	Improbable: too sandy.	Poor: too sandy.
6: Hurricane	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
Pottsburg	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
7 Kingsland	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: wetness, excess humus.
8 Kureb	Good	Probable	Improbable: too sandy.	Poor: too sandy.
9 Leon	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
10 Mandarin	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
11 Chaires	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
12: Newhan	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Corolla	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
13 Goldhead	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
14 Rutlege	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
15 Buccaneer	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
16 Ellabelle	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
17. Urban land				
18:				
Lynn Haven	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Wesconnett	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Leon	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
19 Leon	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, excess salt, wetness.
20 Ortega	Good	Probable	Improbable: too sandy.	Poor: too sandy.
21 Blanton	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
22:				
Sapelo	Poor: wetness.	Improbable: excess fines.	Improbable: too sandy.	Poor: too sandy, wetness.
Leon	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
23 Ocilla	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
24 Kingsferry	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
25 Maurepas	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
26 Centenary	Good	Probable	Improbable: too sandy.	Poor: too sandy.
27 Ridgewood	Good	Probable	Improbable: too sandy.	Poor: too sandy.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
28 Tisonia	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, excess salt, wetness.
29 Resota	Good	Probable	Improbable: too sandy.	Poor: too sandy.
30:				
Kureb	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Resota	Good	Probable	Improbable: too sandy.	Poor: too sandy.
31 Kershaw	Good	Probable	Improbable: too sandy.	Poor: too sandy.
32. Aqualfs				
33:				
Goldhead	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
Meadowbrook	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
34 Croatan	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness, too acid.
36 Boulogne	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
37, 38 Meggett	Poor: wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
39:				
Evergreen	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Leon	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
40 Brookman	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
44 Corolla	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
45 Meggett	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
46-----Buccaneer	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
47-----Leefield	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
49:				
Ousley-----	Fair: wetness.	Probable-----	Improbable: too sandy.	Poor: too sandy.
Mandarin-----	Fair: wetness.	Probable-----	Improbable: too sandy.	Poor: too sandy.
50-----Blanton	Fair: wetness, slope.	Probable-----	Improbable: too sandy.	Poor: too sandy, slope.
51-----Albany	Fair: wetness.	Improbable: thin layer.	Improbable: excess fines.	Poor: too sandy.
52-----Osier	Poor: wetness.	Probable-----	Improbable: too sandy.	Poor: wetness.
53-----Meadowbrook	Poor: wetness.	Probable-----	Improbable: too sandy.	Poor: too sandy, wetness.
54-----Sapelo	Poor: wetness.	Improbable: excess fines.	Improbable: too sandy.	Poor: too sandy, wetness.
55:				
Meadowbrook-----	Poor: wetness.	Probable-----	Improbable: too sandy.	Poor: too sandy, wetness.
Goldhead-----	Poor: wetness.	Probable-----	Improbable: too sandy.	Poor: too sandy, wetness.
Meggett-----	Poor: wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
56:				
Blanton-----	Fair: wetness.	Probable-----	Improbable: too sandy.	Poor: too sandy.
Ortega-----	Good-----	Probable-----	Improbable: too sandy.	Poor: too sandy.
57-----Penney	Good-----	Probable-----	Improbable: too sandy.	Poor: too sandy.

TABLE 11.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
2. Arents							
3. Beaches							
4 Echaw	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Droughty.
5 Fripp	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Slope, too sandy, soil blowing.	Slope, droughty.
6: Hurricane	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Droughty.
Pottsburg	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
7 Kingsland	Severe: seepage.	Severe: excess humus, wetness.	Slight	Flooding, subsides.	Flooding, wetness.	Wetness	Wetness.
8 Kureb	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Too sandy	Droughty.
9 Leon	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
10 Mandarin	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Too sandy, soil blowing, wetness.	Droughty.
11 Chaires	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.

TABLE 11.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
12: Newhan	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Slope, too sandy.	Slope, droughty.
Corolla	Severe: seepage.	Severe: seepage, wetness, piping.	Severe: cutbanks cave.	Slope, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy.	Droughty.
13 Goldhead	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
14 Rutlege	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, fast intake.	Wetness, too sandy.	Wetness.
15 Buccaneer	Slight	Severe: wetness.	Severe: slow refill.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
16 Ellabelle	Severe: seepage.	Severe: wetness.	Severe: cutbanks cave.	Flooding	Fast intake	Wetness	Wetness.
17. Urban land							
18: Lynn Haven	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, fast intake, droughty.	Ponding, too sandy, soil blowing.	Wetness, droughty.
Wesconnett	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, fast intake, soil blowing.	Ponding, too sandy, soil blowing.	Wetness.
Leon	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy.	Wetness, droughty.
19 Leon	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: salty water, cutbanks cave.	Flooding, cutbanks cave, excess salt.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, excess salt, droughty.

TABLE 11.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
20----------------- Ortega	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.
21----------------- Blanton	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Cutbanks cave	Wetness, droughty.	Wetness, too sandy.	Droughty.
22: Sapelo------------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy.	Droughty, wetness.
Leon--------------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
23----------------- Ocilla	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Favorable------	Wetness, droughty, fast intake.	Wetness---------	Droughty.
24----------------- Kingsferry	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Cutbanks cave	Wetness, fast intake, soil blowing.	Wetness, too sandy, soil blowing.	Wetness.
25----------------- Maurepas	Severe: seepage.	Severe: excess humus, ponding.	Slight----------	Ponding, flooding, subsides.	Ponding, flooding.	Ponding---------	Wetness.
26----------------- Centenary	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
27----------------- Ridgewood	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
28----------------- Tisonia	Slight----------	Severe: hard to pack, wetness, excess salt.	Severe: slow refill, salty water.	Percs slowly, flooding, subsides.	Wetness, soil blowing, percs slowly.	Wetness, soil blowing, percs slowly.	Wetness, excess salt, percs slowly.
29----------------- Resota	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.

TABLE 11.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
30:							
Kureb	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Slope, too sandy.	Slope, droughty.
Resota	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
31 Kershaw	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Too sandy, soil blowing.	Droughty.
32. Aqualfs							
33:							
Goldhead	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy, soil blowing.	Wetness, droughty.
Meadowbrook	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy, soil blowing.	Wetness, droughty.
34 Croatan	Severe: seepage.	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, flooding, subsides.	Wetness, percs slowly, flooding.	Wetness	Wetness, percs slowly.
36 Boulogne	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Cutbanks cave	Wetness, fast intake, soil blowing.	Wetness, too sandy, soil blowing.	Wetness.
37, 38 Meggett	Moderate: seepage.	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
39:							
Evergreen	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, subsides, cutbanks cave.	Ponding, soil blowing.	Ponding, too sandy, soil blowing.	Wetness.
Leon	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy.	Wetness, droughty.

TABLE 11.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
40 Brookman	Moderate: seepage.	Severe: hard to pack, ponding.	Severe: slow refill.	Ponding	Ponding, percs slowly.	Ponding	Wetness.
44 Corolla	Severe: seepage.	Severe: seepage, wetness, piping.	Severe: cutbanks cave.	Slope, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy.	Droughty.
45 Meggett	Slight	Severe: hard to pack, ponding.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly.	Ponding, fast intake, percs slowly.	Ponding, percs slowly.	Wetness, rooting depth, percs slowly.
46 Buccaneer	Slight	Severe: wetness.	Severe: slow refill.	Percs slowly	Wetness, slow intake, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
47 Leefield	Moderate: seepage.	Severe: piping, wetness.	Severe: slow refill, cutbanks cave.	Favorable	Wetness, droughty, fast intake.	Wetness	Droughty.
49: Ousley	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, droughty.	Wetness, too sandy.	Droughty.
Mandarin	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Droughty.
50 Blanton	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Slope, cutbanks cave.	Slope, wetness, droughty.	Slope, wetness, too sandy.	Slope, droughty.
51 Albany	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy.	Wetness, droughty.
52 Osier	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy.	Wetness, droughty.
53 Meadowbrook	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.

TABLE 11.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
54----------------- Sapelo	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy.	Droughty, wetness.
55:							
Meadowbrook-------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
Goldhead----------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
Meggett-----------	Moderate: seepage.	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly---	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
56:							
Blanton-----------	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Slope, cutbanks cave.	Slope, wetness, droughty.	Slope, wetness, too sandy.	Slope, droughty.
Ortega------------	Severe: seepage, slope.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
57----------------- Penney	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.

TABLE 12.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated. Some soils may have Unified classifications and USDA textures in addition to those shown. In general, the dominant classifications and textures are shown]

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
2. Arents											
3. Beaches											
4 Echaw	0-35	Fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	50-100	4-10	---	NP
	35-43	Loamy sand, fine sand, sand.	SM, SP-SM	A-2, A-3	0	100	100	50-100	5-30	---	NP
	43-80	Fine sand, loamy sand, sand.	SM, SP-SM	A-2, A-3	0	100	100	50-100	2-20	---	NP
5 Fripp	0-4	Fine sand	SP, SP-SM	A-3	0	100	98-100	85-99	0-5	---	NP
	4-80	Fine sand, sand	SP, SP-SM	A-3	0	100	98-100	85-99	0-5	---	NP
6: Hurricane	0-68	Fine sand	SP, SP-SM	A-3	0	100	100	78-100	4-8	---	NP
	68-80	Sand, fine sand, loamy sand.	SP-SM, SM	A-3, A-2-4	0	100	100	80-100	5-15	---	NP
Pottsburg	0-55	Fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-18	---	NP
	55-80	Sand, fine sand	SP-SM, SP, SM	A-3, A-2-4	0	100	100	90-100	4-18	---	NP
7 Kingsland	0-65	Mucky peat	PT	A-8	0-5	---	---	---	---	---	---
8 Kureb	0-80	Fine sand	SP, SP-SM	A-3	0	100	100	60-100	0-7	---	NP
9 Leon	0-18	Fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	18-21	Sand, fine sand, loamy sand.	SM, SP-SM, SP	A-3, A-2-4	0	100	100	80-100	3-20	---	NP
	21-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
10 Mandarin	0-20	Fine sand	SP, SP-SM	A-3	0	100	100	90-100	2-10	---	NP
	20-31	Fine sand, sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-15	---	NP
	31-80	Fine sand, sand	SP, SP-SM	A-3	0	100	100	90-100	2-7	---	NP
11 Chaires	0-18	Fine sand	SP, SP-SM	A-3	0	100	100	80-100	2-12	---	NP
	18-31	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
	31-80	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6, A-6	0	100	100	85-100	20-36	<40	NP-20
12: Newhan	0-80	Fine sand	SP, SP-SM	A-3	0	95-100	95-100	60-99	0-5	---	NP
Corolla	0-80	Fine sand, sand	SW, SP-SM, SP	A-2, A-3	0	80-100	75-100	45-95	1-12	---	NP

TABLE 12.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
13 Goldhead	0-8	Fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	90-100	2-6	---	NP
	8-33	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	95-100	90-100	90-100	2-6	---	NP
	33-80	Sandy loam, gravelly sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0-3	75-100	65-100	60-100	15-35	20-40	NP-25
14 Rutlege	0-16	Mucky fine sand	SM, SP-SM	A-2, A-3	0	95-100	95-100	70-100	5-35	---	NP
	16-80	Sand, loamy sand, loamy fine sand.	SP-SM, SP, SM	A-2, A-3	0	95-100	95-100	50-80	2-25	<20	NP
15 Buccaneer	0-5	Clay	CH, CL	A-6, A-7	0	100	100	85-100	51-85	40-80	21-50
	5-80	Sandy clay, clay	CH, CL	A-7	0	100	100	85-100	55-90	40-80	21-50
16 Ellabelle	0-36	Mucky fine sand	SM, SP-SM	A-2	0	100	95-100	48-75	11-26	---	NP
	36-80	Sandy clay loam, sandy clay.	SC, CL	A-6, A-7	0	100	95-100	65-90	36-52	32-46	15-25
17. Urban land											
18: Lynn Haven	0-9	Fine sand	SP-SM, SP, SM	A-3, A-2-4	0	100	100	80-100	2-14	---	NP
	9-25	Sand, fine sand	SP-SM, SP	A-3	0	100	100	80-100	2-10	---	NP
	25-80	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	70-100	5-20	---	NP
Wesconnett	0-2	Fine sand	SP-SM	A-3, A-2-4	0	100	100	90-100	5-12	---	NP
	2-32	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-15	---	NP
	32-44	Fine sand, sand	SP-SM	A-3, A-2-4	0	100	100	90-100	5-12	---	NP
	44-80	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-15	---	NP
Leon	0-3	Muck	PT	---	---	---	---	---	---	---	---
	3-17	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	17-80	Sand, fine sand, loamy fine sand.	SM, SP-SM, SP	A-3, A-2-4	0	100	100	80-100	3-20	---	NP
19 Leon	0-26	Fine sand	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	26-40	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	2-15	---	NP
	40-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-100	2-8	---	NP
20 Ortega	0-6	Fine sand	SP, SP-SM	A-3	0	100	100	90-100	3-8	---	NP
	6-80	Fine sand, sand	SP, SP-SM	A-3	0	100	100	90-100	2-7	---	NP
21 Blanton	0-50	Fine sand	SP-SM, SM	A-3, A-2	0	96-100	90-100	65-100	5-20	---	NP
	50-56	Sandy loam, fine sandy loam, loamy sand.	SM	A-2	0	96-100	95-100	65-100	13-30	<25	NP-3
	56-68	Sandy clay loam, sandy loam, fine sandy loam.	SC, SM-SC, SM	A-4, A-2, A-6, A-7	0	96-100	95-100	65-100	25-50	14-45	3-22
	68-80	Sandy clay loam, sandy clay, sandy loam.	SM-SC, SC	A-2, A-4, A-6, A-7	0	96-100	95-100	70-100	30-50	24-45	4-21

TABLE 12.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
22:											
Sapelo	0-21	Fine sand	SM, SP, SP-SM	A-2, A-3	0	100	100	85-100	4-20	---	NP
	21-43	Fine sand, sand, loamy fine sand.	SM, SP-SM	A-2, A-3	0	100	100	80-100	8-20	---	NP
	43-70	Fine sand, sand	SM, SP, SP-SM	A-2, A-3	0	100	100	75-100	4-20	---	NP
	70-80	Sandy loam, sandy clay loam, fine sandy loam.	SM, SC, SM-SC	A-2, A-4, A-6	0	100	100	80-100	20-50	<40	NP-20
Leon	0-20	Fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	20-24	Sand, fine sand, loamy sand.	SM, SP-SM, SP	A-3, A-2-4	0	100	100	80-100	3-20	---	NP
	24-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
23 Ocilla	0-37	Fine sand	SM, SP-SM	A-2, A-3	0	100	95-100	70-100	8-35	---	NP
	37-80	Sandy loam, sandy clay loam, fine sandy loam.	SM, CL, SC, ML	A-2, A-4, A-6	0	100	95-100	80-100	20-55	20-40	NP-18
24 Kingsferry	0-34	Fine sand	SP, SP-SM	A-3	0	100	100	85-100	3-10	---	NP
	34-67	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	85-95	12-20	---	NP
	67-80	Sand, fine sand	SP-SM, SM	A-2-4	0	100	100	85-95	12-20	---	NP
25 Maurepas	0-80	Muck	PT	A-8	0	---	---	---	---	---	---
26 Centenary	0-7	Fine sand	SP, SP-SM	A-3	0	100	100	60-100	4-10	---	NP
	7-66	Sand, fine sand, loamy sand.	SP-SM, SP, SM	A-3, A-2-4	0	100	100	65-100	4-20	---	NP
	66-80	Sand, fine sand, loamy sand.	SP, SP-SM, SM	A-3, A-2-4	0	100	100	60-90	3-20	---	NP
27 Ridgewood	0-7	Fine sand	SP, SP-SM	A-3	0	100	95-100	75-100	2-8	---	NP
	7-80	Sand, fine sand	SP, SP-SM	A-3	0	100	95-100	75-100	2-8	---	NP
28 Tisonia	0-40	Mucky peat	PT	A-8	0	---	---	---	---	---	---
	40-65	Clay	CH	A-7	0	100	100	95-100	90-100	80-95	50-60
29 Resota	0-80	Fine sand	SP, SM, SP-SM	A-3, A-2-4	0	100	100	85-99	1-15	---	NP
30:											
Kureb	0-80	Fine sand	SP, SP-SM	A-3	0	100	100	60-100	0-7	---	NP
Resota	0-80	Fine sand	SP, SM, SP-SM	A-3, A-2-4	0	100	100	85-99	1-15	---	NP
31 Kershaw	0-80	Fine sand	SP, SP-SM, SW	A-2, A-3	0	98-100	98-100	50-100	1-7	---	NP
32. Aqualfs											

TABLE 12.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
33:											
Goldhead	0-27	Fine sand	SP, SP-SM	A-3	0	100	100	90-99	2-6	---	NP
	27-80	Sandy loam, gravelly sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0-3	75-100	65-98	60-99	15-35	20-40	NP-25
Meadowbrook	0-6	Fine sand	SP, SP-SM	A-3	0	100	95-100	70-95	2-10	---	NP
	6-55	Sand, fine sand	SP, SP-SM	A-3	0	100	95-100	70-95	2-10	---	NP
	55-80	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	95-100	70-99	13-35	<35	NP-10
34 Croatan	0-24	Muck	PT	---	---	---	---	---	---	---	---
	24-65	Loam, clay loam, sandy clay loam.	CL, SM, ML, SC	A-4, A-6	0	100	100	75-100	36-95	<36	NP-15
36 Boulogne	0-10	Fine sand	SP, SP-SM	A-3	0	100	100	85-100	3-10	---	NP
	10-13	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	3-20	---	NP
	13-33	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	3-10	---	NP
	33-54	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	8-20	---	NP
	54-80	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-2-4	0	100	100	85-95	12-20	---	NP
37 Meggett	0-16	Loamy fine sand	SM	A-2, A-4	0	100	95-100	50-85	15-55	---	NP
	16-80	Clay, sandy clay, clay loam.	CH, MH, CL	A-6, A-7	0	100	90-100	75-100	51-90	30-60	11-30
38 Meggett	0-11	Fine sandy loam	SM	A-2, A-4	0	100	95-100	50-85	15-55	---	NP
	11-80	Clay, sandy clay, clay loam.	CH, MH, CL	A-6, A-7	0	100	90-100	75-100	51-90	30-60	11-30
39:											
Evergreen	0-11	Muck	PT	---	---	---	---	---	---	---	---
	11-26	Sand, fine sand	SP, SP-SM, SM	A-3, A-2-4	0	100	100	80-100	1-12	---	NP
	26-80	Sand, fine sand, loamy fine sand.	SP, SP-SM, SM	A-3, A-2-4	0	100	100	80-100	1-10	---	NP
Leon	0-3	Muck	PT	---	---	---	---	---	---	---	---
	3-17	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	17-80	Sand, fine sand, loamy fine sand.	SM, SP-SM, SP	A-3, A-2-4	0	100	100	80-100	3-20	---	NP
40 Brookman	0-12	Mucky fine sandy loam.	CL, ML, CL-ML	A-6, A-4	0	100	95-100	75-100	51-81	25-40	4-19
	12-80	Sandy clay, clay, clay loam.	CH, CL	A-7, A-6	0	100	98-100	85-100	55-91	37-65	18-41
44 Corolla	0-72	Fine sand	SW, SP-SM, SP	A-2, A-3	0	80-100	75-100	45-95	1-12	---	NP
45 Meggett	0-18	Loamy fine sand	SM	A-2, A-4	0	100	90-100	85-100	13-41	---	NP
	18-80	Sandy clay, clay, clay loam.	CH, MH, CL	A-6, A-7	0	100	90-100	85-100	51-90	30-60	11-30
46 Buccaneer	0-5	Clay	CH, CL	A-6, A-7	0	100	100	85-100	51-85	40-80	21-50
	5-80	Sandy clay, clay	CH, CL	A-7	0	100	100	85-100	55-90	40-80	21-50

TABLE 12.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
47--------------- Leefield	0-29	Fine sand--------	SM, SW-SM, SP-SM	A-2	0	98-100	95-100	65-95	10-20	---	NP
	29-80	Sandy loam, sandy clay loam.	SC, SM, SM-SC	A-2, A-4, A-6	0	95-100	95-100	65-90	20-40	<40	NP-20
49: Ousley----------	0-7	Fine sand--------	SP-SM, SM	A-2, A-3	0	100	100	70-100	5-25	---	NP
	7-80	Sand, fine sand, coarse sand.	SP-SM, SM, SP	A-1, A-2, A-3	0	100	95-100	36-99	2-15	---	NP
Mandarin--------	0-11	Fine sand--------	SP, SP-SM, SW-SM	A-3	0	100	100	90-100	2-10	---	NP
	11-16	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-15	---	NP
	16-80	Fine sand, sand	SP, SP-SM, SW-SM	A-3	0	100	100	90-100	2-7	---	NP
50--------------- Blanton	0-57	Fine sand--------	SP-SM, SM	A-3, A-2	0	96-100	90-100	65-100	5-20	---	NP
	57-80	Sandy clay loam, sandy loam, fine sandy loam.	SC, SM-SC, SM	A-4, A-2, A-6, A-7	0	96-100	95-100	65-100	25-50	14-45	3-22
51--------------- Albany	0-50	Fine sand--------	SM, SP-SM	A-2	0	100	100	75-100	10-20	---	NP
	50-80	Sandy clay loam, sandy loam, fine sandy loam.	SC, SM, SM-SC	A-2, A-4, A-6	0	97-100	95-100	70-100	20-50	<40	NP-17
52--------------- Osier	0-14	Loamy fine sand	SM	A-2	0	100	98-100	70-90	13-25	---	NP
	14-80	Sand, loamy sand, loamy fine sand.	SP-SM, SM, SP	A-2, A-3	0	100	95-100	65-100	5-20	---	NP
53--------------- Meadowbrook	0-8	Fine sand--------	SP, SP-SM	A-3, A-2-4	0	100	95-100	70-100	2-20	---	NP
	8-44	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	95-100	70-100	2-20	---	NP
	44-80	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	95-100	70-99	13-40	<35	NP-20
54--------------- Sapelo	0-21	Fine sand--------	SM, SP, SP-SM	A-2, A-3	0	100	100	85-100	4-20	---	NP
	21-27	Fine sand, sand, loamy fine sand.	SM, SP-SM	A-2, A-3	0	100	100	80-100	8-20	---	NP
	27-43	Fine sand, sand	SM, SP, SP-SM	A-2, A-3	0	100	100	75-100	4-20	---	NP
	43-80	Sandy loam, sandy clay loam, fine sandy loam.	SM, SC, SM-SC	A-2, A-4, A-6	0	100	100	80-100	20-50	<40	NP-20
55: Meadowbrook-----	0-9	Fine sand--------	SP, SP-SM	A-3, A-2-4	0	100	95-100	70-100	2-20	---	NP
	9-65	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	95-100	70-100	2-20	---	NP
	65-80	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	95-100	70-99	13-40	<35	NP-20
Goldhead--------	0-2	Fine sand--------	SP, SP-SM	A-3	0	100	100	90-100	2-20	---	NP
	2-32	Sand, fine sand	SP, SP-SM	A-3	0	100	100	90-100	2-20	---	NP
	32-80	Sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0-3	75-100	65-100	60-100	15-40	---	---

TABLE 12.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
55:											
Meggett---------	0-8	Fine sandy loam	SM	A-2, A-4	0	100	95-100	50-85	15-55	---	NP
	8-40	Clay, sandy clay, clay loam.	CH, MH, CL	A-6, A-7	0	100	90-100	75-100	51-90	30-60	11-30
	40-80	Sandy clay, sandy clay loam, clay.	SC, SM, ML, MH	A-4, A-6, A-7	0	90-100	65-100	50-100	36-90	30-60	7-25
56:											
Blanton---------	0-58	Fine sand--------	SP-SM, SM	A-3, A-2	0	96-100	90-100	65-100	5-20	---	NP
	58-80	Sandy clay loam, sandy loam, fine sandy loam.	SC, SM-SC, SM	A-4, A-2, A-6, A-7	0	96-100	95-100	65-100	25-50	14-45	3-22
Ortega----------	0-3	Fine sand--------	SP, SP-SM	A-3	0	100	100	90-100	3-8	---	NP
	3-80	Fine sand, sand	SP, SP-SM	A-3	0	100	100	90-100	2-7	---	NP
57--------------- Penney	0-5	Fine sand--------	SP, SP-SM	A-3, A-2-4	0	100	95-100	75-100	2-12	---	NP
	5-41	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	95-100	75-100	2-12	---	NP
	41-80	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	95-100	75-100	5-15	---	NP

TABLE 13.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
									K	T		
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
2. Arents												
3. Beaches												
4----------------	0-35	1-8	1.40-1.60	2.0-20	0.03-0.08	4.5-6.0	<2	Low--------	0.10	5	1	<1
Echaw	35-43	2-10	1.40-1.60	6.0-20	0.05-0.10	4.5-6.0	<2	Low--------	0.10			
	43-80	2-10	1.50-1.70	2.0-6.0	0.03-0.08	4.5-6.0	<2	Low--------	0.10			
5----------------	0-4	<5	1.30-1.70	6.0-20	0.02-0.08	5.1-7.8	<2	Low--------	0.10	5	1	<1
Fripp	4-80	<5	1.30-1.70	6.0-20	0.01-0.03	5.6-7.8	<2	Low--------	0.10			
6: Hurricane--------	0-68	1-4	1.40-1.60	>6.0	0.03-0.07	3.6-6.0	<2	Low--------	0.10	5	2	<2
	68-80	2-8	1.55-1.65	2.0-6.0	0.10-0.15	3.6-6.0	<2	Low--------	0.15			
Pottsburg--------	0-55	0-5	1.20-1.70	6.0-20	0.03-0.10	3.6-6.5	<2	Low--------	0.10	5	2	<3
	55-80	1-6	1.30-1.70	0.6-2.0	0.10-0.25	3.6-6.0	<2	Low--------	0.15			
7---------------- Kingsland	0-65	---	0.25-0.50	6.0-20	0.45-0.50	4.5-6.5	<2	Low--------	----	---	5	>40
8---------------- Kureb	0-80	0-3	1.60-1.80	6.0-20	<0.05	3.6-7.3	<2	Low--------	0.10	5	---	<2
9----------------	0-18	1-6	1.40-1.65	6.0-20	0.02-0.05	3.6-6.5	<2	Low--------	0.10	5	2	.5-4
Leon	18-21	2-8	1.50-1.70	0.6-6.0	0.05-0.10	3.6-6.5	<2	Low--------	0.15			
	21-80	1-6	1.40-1.65	0.6-6.0	0.02-0.05	3.6-6.5	<2	Low--------	0.10			
10---------------	0-20	0-3	1.35-1.45	6.0-20	0.03-0.07	3.6-6.0	<2	Low--------	0.10	5	2	<3
Mandarin	20-31	2-9	1.45-1.60	0.6-2.0	0.10-0.15	3.6-6.0	<2	Low--------	0.15			
	31-80	0-3	1.35-1.45	6.0-20	0.03-0.07	3.6-7.3	<2	Low--------	0.10			
11---------------	0-18	<3	1.35-1.45	6.0-20	0.02-0.05	3.6-5.5	<2	Low--------	0.10	5	2	1-3
Chaires	18-31	2-13	1.45-1.60	0.6-2.0	0.05-0.10	3.6-5.5	<2	Low--------	0.20			
	31-80	15-35	1.60-1.70	0.2-0.6	0.10-0.15	4.5-7.3	<2	Low--------	0.24			
12: Newhan-----------	0-80	---	1.60-1.75	>20	<0.05	6.1-7.8	<2	Low--------	0.10	5	---	---
Corolla----------	0-80	0-3	1.60-1.70	>20	0.01-0.03	6.1-7.8	<2	Low--------	0.10	5	---	<.5
13---------------	0-8	1-5	1.30-1.50	6.0-20	0.05-0.15	4.5-6.0	<2	Low--------	0.10	5	2	1-4
Goldhead	8-33	1-5	1.35-1.50	6.0-20	0.02-0.05	4.5-6.0	<2	Low--------	0.10			
	33-80	13-34	1.45-1.65	0.2-0.6	0.10-0.20	4.5-6.0	<2	Low--------	0.24			
14---------------	0-16	2-10	1.15-1.30	6.0-20	0.20-0.25	3.6-5.5	<2	Low--------	0.10	5	8	10-20
Rutlege	16-80	2-10	1.50-1.70	6.0-20	0.04-0.08	3.6-5.5	<2	Low--------	0.17			
15---------------	0-5	30-55	1.40-1.70	<0.2	0.15-0.20	5.1-7.3	<2	High-------	0.28	5	5	2-10
Buccaneer	5-80	35-60	1.45-1.70	<0.06	0.18-0.22	6.1-8.4	<2	Very high	0.32			
16---------------	0-36	5-10	1.40-1.70	2.0-6.0	0.05-0.08	4.5-5.5	<2	Very low--	0.10	5	---	10-20
Ellabelle	36-80	18-40	1.30-1.50	0.6-2.0	0.12-0.18	4.5-5.5	<2	Low--------	0.15			
17. Urban land												

TABLE 13.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
18:												
Lynn Haven	0-9	1-4	1.35-1.60	6.0-20	0.07-0.10	3.6-5.5	<2	Low	0.10	5	2	2-8
	9-25	1-4	1.35-1.60	6.0-20	0.05-0.07	3.6-5.5	<2	Low	0.10			
	25-80	2-8	1.40-1.50	0.6-6.0	0.10-0.15	3.6-5.5	<2	Low	0.15			
Wesconnett	0-2	1-7	1.10-1.40	6.0-20	0.10-0.15	3.6-6.5	<2	Low	0.10	5	2	2-10
	2-32	3-8	1.30-1.55	0.6-6.0	0.10-0.15	3.6-6.5	<2	Low	0.15			
	32-44	2-7	1.35-1.50	6.0-20	0.05-0.08	3.6-6.5	<2	Low	0.10			
	44-80	2-8	1.40-1.65	0.6-6.0	0.10-0.15	3.6-6.5	<2	Low	0.15			
Leon	0-3	---	0.40-0.65	6.0-20	0.25-0.40	3.6-5.5	<2	Low	----	---	---	20-80
	3-17	1-6	1.40-1.65	6.0-20	0.02-0.05	3.6-5.5	<2	Low	0.10			
	17-80	2-8	1.50-1.70	0.6-6.0	0.10-0.15	3.6-5.5	<2	Low	0.15			
19	0-26	1-3	1.40-1.55	2.0-6.0	0.05-0.10	5.5-8.4	8-16	Low	0.10	5	2	1-3
Leon	26-40	2-8	1.40-1.60	0.6-6.0	0.10-0.15	5.5-8.4	8-16	Low	0.15			
	40-80	2-10	1.55-1.80	0.6-6.0	0.05-0.15	5.5-8.4	2-8	Low	0.10			
20	0-6	1-3	1.20-1.45	6.0-20	0.05-0.08	3.6-6.5	<2	Low	0.10	5	2	1-2
Ortega	6-80	1-3	1.35-1.60	6.0-20	0.03-0.06	3.6-6.5	<2	Low	0.10			
21	0-50	1-7	1.40-1.65	6.0-20	0.03-0.07	4.5-6.0	<2	Low	0.10	5	2	.5-2
Blanton	50-56	10-18	1.50-1.65	2.0-6.0	0.10-0.15	4.5-6.0	<2	Low	0.15			
	56-68	12-30	1.60-1.70	0.6-2.0	0.10-0.15	4.5-6.0	<2	Low	0.20			
	68-80	14-40	1.50-1.65	0.6-2.0	0.10-0.15	4.5-6.0	<2	Low	0.24			
22:												
Sapelo	0-21	2-5	1.40-1.65	6.0-20	0.03-0.07	3.6-5.5	<2	Low	0.10	5	---	1-3
	21-43	3-7	1.35-1.60	0.6-2.0	0.10-0.15	3.6-5.5	<2	Low	0.15			
	43-70	3-6	1.50-1.70	6.0-20	0.03-0.07	3.6-5.5	<2	Low	0.17			
	70-80	10-30	1.55-1.75	0.6-2.0	0.12-0.17	3.6-5.5	<2	Low	0.24			
Leon	0-20	1-6	1.40-1.65	6.0-20	0.02-0.05	3.6-6.5	<2	Low	0.10	5	2	.5-4
	20-24	2-8	1.50-1.70	0.6-6.0	0.05-0.10	3.6-6.5	<2	Low	0.15			
	24-80	1-6	1.40-1.65	0.6-6.0	0.02-0.05	3.6-6.5	<2	Low	0.10			
23	0-37	3-10	1.45-1.65	2.0-20	0.05-0.07	4.5-5.5	<2	Low	0.10	5	2	1-2
Ocilla	37-80	15-35	1.55-1.70	0.2-0.6	0.09-0.12	4.5-5.5	<2	Low	0.24			
24	0-34	1-7	1.40-1.55	2.0-6.0	0.10-0.15	3.6-5.5	<2	Low	0.17	5	2	1-5
Kingsferry	34-67	3-12	1.50-1.65	2.0-6.0	0.10-0.15	3.6-5.5	<2	Low	----			
	67-80	3-12	1.40-1.70	0.2-0.6	0.10-0.15	3.6-5.5	<2	Low	----			
25	0-80	---	0.05-0.25	6.0-20	0.20-0.50	5.6-8.4	<4	Low	----	---	---	---
Maurepas												
26	0-7	1-8	1.40-1.60	6.0-20	0.03-0.08	4.5-6.5	<2	Low	0.10	5	1	<1
Centenary	7-66	1-8	1.40-1.60	6.0-20	0.03-0.05	4.5-6.0	<2	Low	0.10			
	66-80	2-10	1.50-1.70	2.0-6.0	0.03-0.10	4.5-6.0	<2	Low	0.10			
27	0-7	0-3	1.30-1.55	6.0-20	0.04-0.08	3.6-6.0	<2	Low	0.10	5	2	0-2
Ridgewood	7-80	0-3	1.35-1.65	6.0-20	0.02-0.06	3.6-6.0	<2	Low	0.10			
28	0-40	---	0.20-0.50	6.0-20	0.25-0.35	6.1-7.8	>16	Low	----	---	2	40-65
Tisonia	40-65	60-85	1.05-1.40	<0.06	0.15-0.20	6.1-7.8	>16	High	0.20			
29	0-80	0-3	1.30-1.60	>20	0.02-0.05	3.6-6.5	<2	Low	0.10	5	1	<1
Resota												
30:												
Kureb	0-80	0-3	1.60-1.80	6.0-20	<0.05	3.6-7.3	<2	Low	0.10	5	---	<2
Resota	0-80	0-3	1.30-1.60	>20	0.02-0.05	3.6-6.5	<2	Low	0.10	5	1	<1

TABLE 13.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
31--------------- Kershaw	0-80	<5	1.35-1.60	>20	0.02-0.05	4.5-6.0	<2	Very low	0.10	5	1	<1
32. Aqualfs												
33: Goldhead--------	0-27	1-5	1.30-1.50	6.0-20	0.05-0.15	4.5-6.0	<2	Low-------	0.10	5	2	2-4
	27-80	13-34	1.45-1.60	0.2-0.6	0.10-0.20	4.5-6.0	<2	Low-------	0.24			
Meadowbrook-----	0-6	0-3	1.35-1.65	6.0-20	0.05-0.10	3.6-7.3	<2	Low-------	0.10	5	2	2-4
	6-55	1-6	1.35-1.65	6.0-20	0.03-0.08	3.6-8.4	<2	Low-------	0.10			
	55-80	11-32	1.50-1.65	0.2-0.6	0.10-0.15	4.5-8.4	<2	Low-------	0.15			
34--------------- Croatan	0-24	---	0.40-0.65	2.0-6.0	0.35-0.45	<4.5	<2	Low-------	----	---	---	25-60
	24-65	10-35	1.40-1.60	0.2-0.6	0.12-0.20	3.6-6.5	<2	Low-------	----			
36--------------- Boulogne	0-10	1-7	1.40-1.55	6.0-20	0.10-0.15	3.6-6.0	<2	Low-------	0.17	5	2	1-5
	10-13	3-8	1.50-1.65	2.0-6.0	0.10-0.15	3.6-6.0	<2	Low-------	0.20			
	13-33	1-4	1.50-1.65	6.0-20	0.05-0.10	3.6-6.0	<2	Low-------	0.17			
	33-54	3-12	1.50-1.65	0.6-2.0	0.10-0.15	3.6-6.0	<2	Low-------	0.24			
	54-80	3-12	1.40-1.70	<0.2	0.10-0.15	3.6-6.0	<2	Low-------	0.20			
37--------------- Meggett	0-16	5-20	1.20-1.40	2.0-6.0	0.10-0.15	4.5-6.5	<2	Low-------	0.24	5	---	2-8
	16-80	30-60	1.45-1.60	0.06-0.2	0.13-0.18	5.1-6.5	<2	High------	0.32			
38--------------- Meggett	0-11	5-20	1.20-1.40	2.0-6.0	0.10-0.15	4.5-6.5	<2	Low-------	0.24	5	---	2-8
	11-80	30-60	1.45-1.60	0.06-0.2	0.13-0.18	5.1-8.4	<2	High------	0.32			
39: Evergreen-------	0-11	---	0.40-0.65	6.0-20	0.25-0.40	3.6-5.5	<2	Low-------	----	---	---	60-90
	11-26	1-8	1.40-1.70	6.0-20	0.02-0.05	3.6-5.5	<2	Low-------	0.10			
	26-80	1-5	1.50-1.65	0.6-2.0	0.05-0.10	3.6-5.5	<2	Low-------	0.10			
Leon------------	0-3	---	0.40-0.65	6.0-20	0.25-0.40	3.6-5.5	<2	Low-------	----	---	---	20-80
	3-17	1-6	1.40-1.65	6.0-20	0.02-0.05	3.6-5.5	<2	Low-------	0.10			
	17-80	2-8	1.50-1.70	0.6-2.0	0.05-0.10	3.6-5.5	<2	Low-------	0.15			
40--------------- Brookman	0-12	5-30	1.20-1.45	0.6-2.0	0.15-0.20	4.5-6.5	<2	Low-------	0.24	4	5	3-10
	12-80	35-55	1.30-1.50	0.06-0.2	0.18-0.22	4.5-6.5	<2	Moderate	0.28			
44--------------- Corolla	0-72	0-3	1.60-1.70	>20	0.01-0.03	6.1-7.8	<2	Low-------	0.10	5	---	<.5
45--------------- Meggett	0-18	5-20	1.10-1.30	2.0-6.0	0.10-0.15	4.5-6.5	<2	Low-------	0.24	5	---	2-8
	18-80	35-60	1.40-1.75	0.06-0.2	0.12-0.18	6.1-8.4	<2	High------	0.32			
46--------------- Buccaneer	0-5	30-55	1.40-1.70	<0.2	0.15-0.20	5.1-7.3	<2	High------	0.28	5	5	2-10
	5-80	35-60	1.45-1.70	<0.06	0.18-0.22	6.1-8.4	<2	Very high	0.32			
47--------------- Leefield	0-29	5-10	1.45-1.60	6.0-20	0.04-0.07	4.5-6.0	<2	Low-------	0.10	5	---	1-2
	29-80	15-30	1.50-1.70	0.2-0.6	0.08-0.12	4.5-5.5	<2	Low-------	0.10			
49: Ousley----------	0-7	1-3	1.35-1.45	6.0-20	0.05-0.10	4.5-5.5	<2	Low-------	0.10	5	---	<.5
	7-80	1-2	1.45-1.60	6.0-20	0.02-0.06	4.5-5.5	<2	Low-------	0.15			
Mandarin--------	0-11	0-3	1.35-1.45	6.0-20	0.03-0.07	3.6-6.0	<2	Low-------	0.10	5	2	<3
	11-16	2-9	1.45-1.60	0.6-2.0	0.10-0.15	3.6-6.0	<2	Low-------	0.15			
	16-80	0-3	1.35-1.45	6.0-20	0.03-0.07	4.5-7.3	<2	Low-------	0.10			
50--------------- Blanton	0-57	1-7	1.40-1.65	6.0-20	0.03-0.07	4.5-6.0	<2	Low-------	0.10	5	2	.5-2
	57-80	12-30	1.60-1.70	0.6-2.0	0.10-0.15	4.5-6.0	<2	Low-------	0.20			

TABLE 13.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
									K	T		
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
51	0-50	1-10	1.40-1.55	6.0-20	0.02-0.04	3.6-6.5	<2	Low	0.10	5	1	1-2
Albany	50-80	13-35	1.55-1.65	0.2-0.6	0.10-0.16	4.5-6.0	<2	Low	0.24			
52	0-14	10-15	1.35-1.60	6.0-20	0.10-0.15	3.6-6.0	<2	Low	0.15	5	3	2-5
Osier	14-80	1-10	1.40-1.60	6.0-20	0.03-0.10	3.6-6.0	<2	Low	0.10			
53	0-8	0-3	1.35-1.65	6.0-20	0.05-0.10	4.5-6.0	<2	Low	0.10	5	2	1-3
Meadowbrook	8-44	1-6	1.35-1.65	6.0-20	0.03-0.08	4.5-6.0	<2	Low	0.10			
	44-80	11-22	1.50-1.80	0.2-0.6	0.10-0.15	4.5-6.0	<2	Low	0.15			
54	0-21	2-5	1.40-1.65	6.0-20	0.03-0.07	3.6-5.5	<2	Low	0.10	5	---	1-3
Sapelo	21-27	3-7	1.35-1.60	0.6-2.0	0.10-0.15	3.6-5.5	<2	Low	0.15			
	27-43	3-6	1.50-1.70	6.0-20	0.03-0.07	3.6-5.5	<2	Low	0.17			
	43-80	10-30	1.55-1.75	0.2-0.6	0.12-0.17	3.6-5.5	<2	Low	0.24			
55:												
Meadowbrook	0-9	0-3	1.35-1.65	6.0-20	0.05-0.10	4.5-6.0	<2	Low	0.10	5	2	1-3
	9-65	1-6	1.35-1.65	6.0-20	0.03-0.08	4.5-6.0	<2	Low	0.10			
	65-80	11-22	1.50-1.80	0.2-0.6	0.10-0.15	4.5-6.0	<2	Low	0.15			
Goldhead	0-2	1-5	1.30-1.50	6.0-20	0.05-0.15	4.5-6.0	<2	Low	0.10	5	2	1-4
	2-32	1-5	1.35-1.50	6.0-20	0.02-0.05	4.5-6.0	<2	Low	0.10			
	32-80	13-34	1.45-1.65	0.2-0.6	0.10-0.20	4.5-6.0	<2	Low	0.24			
Meggett	0-8	5-20	1.20-1.40	2.0-6.0	0.10-0.15	4.5-6.5	<2	Low	0.24	5	---	2-8
	8-40	30-60	1.45-1.60	0.06-0.2	0.13-0.18	5.1-6.5	<2	High	0.32			
	40-80	25-50	1.40-1.60	0.06-0.2	0.12-0.18	6.1-6.5	<2	Moderate	0.28			
56:												
Blanton	0-58	1-7	1.40-1.65	6.0-20	0.03-0.07	4.5-6.0	<2	Low	0.10	5	2	.5-2
	58-80	12-30	1.60-1.70	0.6-2.0	0.10-0.15	4.5-6.0	<2	Low	0.20			
Ortega	0-3	1-3	1.20-1.45	6.0-20	0.05-0.08	3.6-6.5	<2	Low	0.10	5	2	1-2
	3-80	1-3	1.35-1.60	6.0-20	0.03-0.06	3.6-6.5	<2	Low	0.10			
57	0-5	0-3	1.30-1.55	6.0-20	0.04-0.08	3.6-6.0	<2	Low	0.10	5	2	0-2
Penney	5-41	0-3	1.35-1.65	6.0-20	0.02-0.06	3.6-6.0	<2	Low	0.10			
	41-80	2-6	1.50-1.65	6.0-20	0.05-0.08	3.6-6.0	<2	Low	0.10			

TABLE 14.--WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
2. Arents							
3. Beaches							
4 Echaw	A	None	---	---	2.5-5.0	Apparent	Nov-Apr
5 Fripp	A	Rare	---	---	>6.0	---	---
6:							
Hurricane	C	None	---	---	2.0-3.5	Apparent	Jan-Sept
Pottsburg	B/D	None	---	---	1.0-2.0	Apparent	Jan-Sept
7 Kingsland	A/D	Frequent	Very long	Jan-Dec	0-0.5	Apparent	Jan-Dec
8 Kureb	A	None	---	---	>6.0	---	---
9 Leon	B/D	None	---	---	0.5-1.5	Apparent	Dec-Oct
10 Mandarin	C	None	---	---	1.5-3.5	Apparent	Jan-Sept
11 Chaires	B/D	None	---	---	0.5-1.5	Apparent	Dec-Oct
12:							
Newhan	A	None	---	---	>6.0	---	---
Corolla	D	Rare	---	---	1.5-3.0	Apparent	Nov-Oct
13 Goldhead	B/D	None	---	---	0-1.0	Apparent	Dec-Oct
14 Rutlege	B/D	Frequent	---	---	0-0.5	Apparent	Dec-Oct
15 Buccaneer	D	Frequent	Very long	Jan-Oct	0-0.5	Apparent	Dec-Oct
16 Ellabelle	D	Frequent	Very long	Nov-Oct	0-0.5	Apparent	Jan-Oct
17. Urban land							
18:							
Lynn Haven	D	None	---	---	+2-0	Apparent	Jan-Oct
Wesconnett	D	None	---	---	+2-0	Apparent	Jan-Oct

TABLE 14.--WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
18:							
Leon	D	None	---	---	+2-0	Apparent	Jan-Oct
19 Leon	D	Frequent	Very long	Jan-Dec	0-0.5	Apparent	Jan-Dec
20 Ortega	A	None	---	---	3.5-5.0	Apparent	Jan-Sept
21 Blanton	B	None	---	---	2.5-4.0	Perched	Jan-Sept
22:							
Sapelo	D	None	---	---	0-1.0	Apparent	Jan-Oct
Leon	B/D	None	---	---	0-1.0	Apparent	Jan-Oct
23 Ocilla	C	None	---	---	1.0-2.5	Apparent	Jan-Oct
24 Kingsferry	B/D	None	---	---	0-0.5	Perched	Dec-Oct
25 Maurepas	D	Frequent	Brief to very long.	Jan-Dec	+1-0.5	Apparent	Jan-Dec
26 Centenary	A	None	---	---	3.5-5.0	Apparent	Jan-Sept
27 Ridgewood	A	None	---	---	2.0-3.5	Apparent	Jun-Oct
28 Tisonia	D	Frequent	Very long	Jan-Dec	0-0.5	Apparent	Jan-Dec
29 Resota	A	None	---	---	3.5-5.0	Apparent	Jan-Sept
30:							
Kureb	A	None	---	---	>6.0	---	---
Resota	A	None	---	---	3.5-5.0	Apparent	Jan-Sept
31 Kershaw	A	None	---	---	>6.0	---	---
32. Aqualfs							
33:							
Goldhead	D	None	---	---	+2-0	Apparent	Dec-Oct
Meadowbrook	D	None	---	---	+2-0	Apparent	Dec-Oct
34 Croatan	D	Frequent	Very long	Jan-Dec	0-0.5	Apparent	Dec-Oct
36 Boulogne	B/D	None	---	---	0.5-1.5	Perched	Dec-Oct
37 Meggett	D	None	---	---	0-1.0	Apparent	Dec-Oct

TABLE 14.--WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
38 Meggett	D	Rare	---	---	0-0.5	Apparent	Dec-Oct
39:							
Evergreen	D	None	---	---	+2-0	Apparent	Jan-Oct
Leon	D	None	---	---	+2-0	Apparent	Jan-Oct
40 Brookman	D	None	---	---	+2-0	Apparent	Dec-Oct
44 Corolla	D	Rare	---	---	1.5-3.0	Apparent	Dec-Oct
45 Meggett	D	None	---	---	+2-0	Apparent	Dec-Oct
46 Buccaneer	D	Rare	---	---	0-0.5	Apparent	Dec-Oct
47 Leefield	C	None	---	---	1.5-2.5	Apparent	Dec-Sept
49:							
Ousley	C	Occasional	Brief	Dec-Oct	1.5-3.0	Apparent	Dec-Oct
Mandarin	B/D	Occasional	Brief	Dec-Oct	1.5-3.5	Apparent	Dec-Oct
50 Blanton	B	None	---	---	2.5-4.0	Perched	Jan-Oct
51 Albany	C	None	---	---	1.0-2.5	Apparent	Jan-Oct
52 Osier	A/D	Frequent	---	---	0-0.5	Apparent	Dec-Oct
53 Meadowbrook	B/D	None	---	---	0-1.0	Apparent	Dec-Oct
54 Sapelo	D	None	---	---	0-1.0	Apparent	Dec-Oct
55:							
Meadowbrook	B/D	None	---	---	0-0.5	Apparent	Jan-Nov
Goldhead	B/D	None	---	---	0-0.5	Apparent	Jan-Nov
Meggett	D	None	---	---	0-0.5	Apparent	Jan-Nov
56:							
Blanton	B	None	---	---	2.5-4.0	Perched	Jan-Oct
Ortega	A	None	---	---	3.5-5.0	Apparent	Jun-Oct
57 Penney	A	None	---	---	>6.0	---	---

TABLE 15.--PHYSICAL ANALYSES OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Particle-size distribution: Sand: Very coarse (2.0-1.0 mm)	Sand: Coarse (1.0-0.5 mm)	Sand: Medium (0.5-0.25 mm)	Sand: Fine (0.25-0.1 mm)	Sand: Very fine (0.1-0.05 mm)	Sand: Total (2-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Hydraulic conductivity	Bulk density (field moist)	Water content: 1/10 bar	Water content: 1/3 bar	Water content: 15 bar
	Cm		Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Cm/hr	g/cm	Pct (wt)		
Albany fine sand:															
S45-7-1	0-5	A	0.0	0.1	1.8	78.0	12.4	92.3	4.7	3.0	4.0	1.50	13.2	9.4	2.0
-2	5-13	E1	0.0	0.1	1.9	73.6	15.1	90.7	7.0	2.3	5.1	1.61	10.7	7.1	1.2
-3	13-43	E2	0.0	0.1	1.7	71.4	17.1	90.3	7.1	2.6	4.7	1.62	9.2	7.0	2.6
-4	43-91	E3	0.0	0.1	2.0	73.4	15.8	91.3	6.9	1.8	13.1	1.46	8.2	4.4	0.8
-5	91-127	E4	0.0	0.0	1.7	73.1	16.9	91.7	7.1	1.2	16.4	1.47	7.2	3.4	0.4
-6	127-142	BE	0.0	0.0	1.5	66.2	10.4	78.1	4.6	17.3	0.3	1.61	16.4	13.6	5.9
-7	142-157	Btg1	0.0	0.0	1.4	63.9	8.1	73.4	2.5	24.1	0.2	1.60	21.6	19.4	8.8
-8	157-203	Btg2	0.0	0.2	2.6	70.0	6.6	79.4	2.0	18.6	0.0	1.62	21.9	20.4	8.8
Boulogne fine sand:															
S45-15-1	0-18	Ap	0.0	0.2	3.5	85.4	4.7	93.8	4.9	1.3	12.7	1.38	10.7	8.8	1.3
-2	18-25	A	0.0	0.1	3.1	85.7	4.8	93.7	5.1	1.2	13.5	1.47	9.6	7.6	1.0
-3	25-33	Bh	0.0	0.2	3.1	82.7	4.6	90.6	6.5	2.9	15.9	1.47	10.7	6.5	1.3
-4	33-48	E1	0.0	0.2	3.0	84.1	4.8	92.1	6.0	1.9	26.0	1.46	8.1	4.9	1.1
-5	48-66	E2	0.0	0.2	3.3	85.4	4.4	93.3	4.9	1.8	22.7	1.55	6.4	3.8	0.8
-6	66-84	E3	0.0	0.2	3.3	87.7	4.6	95.8	3.5	0.7	30.9	1.55	4.3	3.2	0.4
-7	84-102	B'h1	0.0	0.3	3.5	74.7	3.4	81.9	12.0	6.1	1.4	1.80	12.6	11.0	2.4
-8	102-137	B'h2	0.0	0.1	3.1	84.6	3.2	91.0	5.0	4.0	8.3	1.53	20.3	15.6	2.8
-9	137-203	B'h3	0.0	0.0	2.1	88.5	3.1	93.7	3.1	3.2	0.4	1.48	17.7	15.7	4.1
Buccaneer clay:															
S45-17-1	0-13	A	0.0	0.1	0.4	16.6	13.2	30.3	18.8	50.9	0.0	1.19	48.6	47.6	23.1
-2	13-51	Btg1	0.0	0.0	0.4	11.2	10.4	22.0	20.0	58.9	0.0	1.17	47.8	46.9	25.0
-3	51-81	Btg2	0.0	0.0	0.4	13.4	11.4	25.2	19.1	55.7	0.0	1.17	47.2	46.8	25.7
-4	81-122	Btg3	0.0	0.0	0.4	15.8	13.4	29.6	21.5	48.9	0.2	1.19	46.4	45.8	24.8
-5	122-185	Btg4	0.0	0.0	0.4	15.6	12.8	28.8	21.8	49.4	0.0	1.31	39.9	38.2	21.4
-6	185-203	Cg	0.0	0.0	0.2	13.0	13.8	27.0	22.6	50.4	0.3	1.19	46.6	45.8	25.0
Centenary fine sand:															
S45-8-1	0-8	A1	0.0	0.0	4.0	90.3	3.3	97.6	1.1	1.3	25.0	1.40	7.5	5.0	1.4
-2	8-18	A2	0.0	0.1	4.4	88.6	3.9	97.0	1.5	1.5	34.2	1.38	6.4	4.3	0.9
-3	18-66	E1	0.0	0.2	4.3	89.1	3.9	97.5	1.0	1.5	34.2	1.46	4.9	3.1	0.7
-4	66-91	E2	0.0	0.1	4.1	89.6	3.9	97.7	0.8	1.5	47.3	1.46	4.2	2.6	0.6
-5	91-117	E3	0.0	0.1	3.5	90.1	4.4	98.1	0.9	1.0	34.5	1.50	3.6	2.0	0.4
-6	117-152	E4	0.0	0.1	3.7	90.3	4.3	98.4	0.8	0.8	25.0	1.52	3.2	2.0	0.3
-7	152-178	Bh1	0.0	0.1	3.4	90.4	3.7	97.6	0.8	1.6	23.0	1.54	5.9	4.0	0.7
-8	178-203	Bh2	0.0	0.0	3.1	91.9	3.7	98.7	0.3	1.0	16.1	1.51	7.2	5.6	1.0

TABLE 15.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution								Hydraulic conductivity	Bulk density (field moist)	Water content		
			Sand						Silt (0.05-0.002 mm)	Clay (<0.002 mm)			1/10 bar	1/3 bar	15 bar
			Very coarse (2.0-1.0 mm)	Coarse (1.0-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)							
	Cm		Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Cm/hr	g/cm	Pct (wt)		
Chaires fine sand:															
S45-16-1	0-18	A	0.0	0.6	7.9	74.9	8.8	92.2	6.3	1.5	20.4	1.41	11.5	9.6	3.2
-2	18-46	E1	0.0	0.6	8.2	76.7	8.4	93.9	5.7	0.4	27.0	1.46	6.8	5.3	0.6
-3	46-58	E2	0.0	0.7	8.1	75.6	8.8	93.2	6.5	0.3	10.9	1.57	6.8	3.2	0.7
-4	58-74	Bh1	0.0	0.6	7.2	70.5	8.0	86.3	8.7	5.0	0.3	1.74	15.1	11.1	3.0
-5	74-91	Bh2	0.0	0.6	7.4	71.8	8.5	88.3	7.9	3.8	13.1	1.55	10.7	7.5	2.7
-6	91-96	E'	0.0	0.6	7.5	78.1	8.8	87.5	11.5	1.0	21.0	1.60	5.6	2.4	0.6
-7	96-140	Btg1	0.0	0.2	5.0	47.2	4.0	56.4	9.3	34.3	0.2	1.51	29.2	26.9	14.7
-8	140-165	Btg2	0.2	1.0	5.8	43.2	4.2	54.4	12.7	32.9	0.0	1.61	24.9	24.5	13.1
-9	165-203	Btg3	0.2	1.2	6.8	44.4	4.4	57.0	12.3	30.7	0.0	1.76	20.1	20.0	10.4
Chaires fine sand:															
S45-22-1	0-18	A	0.1	3.3	11.5	71.0	7.9	93.8	5.0	1.2	47.3	1.28	15.4	9.4	3.1
-2	18-46	E	0.5	4.0	11.2	70.8	7.7	94.2	5.1	0.7	22.4	1.53	5.4	2.5	0.4
-3	46-56	Bh1	0.5	3.8	10.2	67.1	7.9	89.5	6.6	3.9	13.6	1.43	21.7	15.2	4.5
-4	56-68	Bh2	0.4	3.4	9.2	68.1	8.1	91.2	8.3	0.5	8.0	1.44	18.9	12.3	2.3
-5	68-79	BE	0.4	3.6	10.0	69.4	7.7	93.1	3.8	3.1	18.2	1.51	10.1	6.1	1.9
-6	79-91	Btg1	0.0	1.2	5.8	52.4	5.9	66.8	4.7	28.5	4.5	1.50	23.7	20.6	10.3
-7	91-127	Btg2	0.0	0.5	4.1	54.5	4.7	65.2	3.7	31.1	2.6	1.46	25.8	22.4	11.1
-8	127-165	Btg3	0.0	0.3	3.4	60.3	7.1	72.7	2.9	24.4	0.6	1.66	19.6	16.3	9.1
-9	165-203	Btg4	0.0	0.5	3.6	64.4	8.1	76.6	4.8	18.6	0.4	1.67	17.2	14.2	7.7
Corolla fine sand:															
S45-20-1	0-15	A	0.0	0.6	9.6	87.4	2.1	99.7	0.1	0.2	76.3	1.48	3.1	2.1	0.7
-2	15-30	C1	0.0	1.3	13.5	82.6	2.0	99.4	0.2	0.4	76.3	1.50	3.0	2.0	0.6
-3	30-51	C2	0.1	2.4	8.1	84.7	3.9	99.2	0.4	0.4	57.2	1.46	3.0	1.8	0.5
-4	51-66	C3	1.5	18.0	43.8	35.0	0.5	98.8	0.3	0.9	82.8	1.48	2.6	1.8	0.7
-5	66-104	C4	0.6	11.7	47.2	39.5	0.4	99.4	0.1	0.5	101.0	1.51	2.7	2.1	0.8
-6	104-203	C5	2.4	19.6	46.3	30.3	0.4	99.0	0.5	0.5	92.7	1.48	2.8	2.1	1.0
Echaw fine sand:															
S45-13-1	0-15	A	0.0	0.1	4.1	91.6	2.4	98.2	0.8	1.0	61.8	0.97	19.8	14.6	5.6
-2	15-51	E1	0.0	0.1	4.1	91.6	2.2	98.4	1.0	0.6	33.2	1.43	4.1	2.7	1.1
-3	51-89	E2	0.0	0.1	3.9	92.0	2.2	98.2	1.3	0.5	30.6	1.46	2.8	2.0	0.5
-4	89-96	Bh	0.0	0.1	3.5	87.3	2.2	93.1	2.4	4.5	32.2	1.34	11.0	8.6	3.2
-5	96-109	E'1	0.0	0.1	3.2	91.5	2.2	97.0	0.4	2.6	49.3	1.39	6.2	4.5	1.6
-6	109-137	E'2	0.0	0.1	3.2	90.2	2.3	95.8	2.3	1.9	40.1	1.43	4.9	3.4	1.2
-7	137-183	E'3	0.0	0.1	3.8	90.3	2.3	96.5	1.9	1.6	37.5	1.51	4.2	2.5	0.7
-8	183-206	E'4	0.0	0.2	3.1	92.3	2.5	98.1	0.9	1.0	57.9	1.45	3.4	2.0	0.6
-9	206-231	B'h	0.0	0.1	3.1	93.6	2.2	99.0	0.1	0.9	39.4	1.47	5.3	3.5	1.0

TABLE 15.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution								Hydraulic conductivity	Bulk density (field moist)	Water content		
			Sand						Silt (0.05-0.002 mm)	Clay (<0.002 mm)			1/10 bar	1/3 bar	15 bar
			Very coarse (2.0-1.0 mm)	Coarse (1.0-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)							
	Cm		Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Cm/hr	g/cm	Pct (wt)		
Evergreen muck:															
S45-14-1	0-8	Oe	---	---	---	---	---	---	---	---	104.0	0.22	286.7	223.2	54.3
-2	8-28	Oa	---	---	---	---	---	---	---	---	91.4	0.34	208.3	184.4	34.4
-3	28-36	A1	0.0	0.0	2.2	76.5	3.9	82.6	9.7	7.7	4.8	1.57	19.7	18.6	4.1
-4	36-43	A2	0.0	0.0	2.6	85.2	3.3	91.1	4.3	4.6	34.2	1.32	20.8	18.4	1.0
-5	43-66	E	0.0	0.0	2.4	90.0	3.7	96.1	2.8	1.1	13.6	1.55	6.0	4.6	0.6
-6	66-140	Bh1	0.0	0.0	2.1	87.6	3.8	93.5	1.9	4.6	0.9	1.55	20.1	18.4	4.3
-7	140-203	Bh2	0.0	0.0	2.9	91.7	3.7	98.3	0.8	0.9	23.3	1.52	7.4	6.0	0.8
Fripp fine sand:															
S45-1-1	0-10	A	0.0	0.0	5.0	89.4	5.1	99.5	0.2	0.3	61.8	1.46	3.4	2.3	1.0
-2	10-76	C	0.0	0.0	11.2	86.5	2.0	99.7	0.1	0.2	59.2	1.44	3.3	2.1	1.1
-3	76-140	C	0.0	0.0	1.6	95.4	2.8	99.8	0.1	0.1	55.9	1.40	2.8	1.8	0.8
-4	140-203	C	0.0	0.0	1.1	94.2	4.3	99.6	0.1	0.3	48.0	1.40	3.0	1.8	0.8
Goldhead fine sand:															
S45-24-1	0-20	A	0.0	0.2	1.0	64.1	23.7	89.0	8.5	2.5	41.8	1.33	26.3	15.4	2.0
-2	20-41	E1	0.0	0.2	1.1	66.9	22.8	91.0	8.0	1.0	3.3	1.47	14.8	7.0	0.8
-3	41-84	E2	0.0	0.2	1.1	67.1	23.5	91.9	7.4	0.7	4.8	1.58	9.8	3.8	0.5
-4	84-168	Btg	0.0	0.0	0.1	41.2	15.9	57.2	9.6	33.2	0.6	1.54	21.2	16.7	5.6
-5	168-203	C	0.0	0.0	0.6	72.9	9.6	83.1	4.0	12.9	1.8	1.53	14.5	8.4	3.2
Goldhead fine sand:															
S45-26-1	0-15	A	0.0	0.1	2.0	72.6	17.2	91.9	4.8	3.3	30.2	1.24	21.5	12.6	3.1
-2	15-30	E1	0.0	0.1	1.9	73.4	15.3	90.7	6.3	3.0	12.5	1.43	13.2	7.1	1.7
-3	30-84	E2	0.0	0.1	1.9	70.5	16.1	88.6	6.2	5.2	7.7	1.46	13.2	7.8	2.1
-4	84-135	Btg1	0.0	0.0	0.8	43.6	21.6	66.0	6.6	27.4	0.8	1.56	22.6	16.0	7.3
-5	135-203	Btg2	0.0	0.0	0.2	23.6	41.6	65.4	8.6	26.0	0.1	1.59	23.9	20.2	10.2
Hurricane fine sand:															
S45-11-1	0-13	Ap	0.0	0.2	4.3	89.8	2.3	96.6	1.4	2.0	30.6	1.40	7.3	4.7	1.1
-2	13-25	E1	0.0	0.2	4.4	88.1	3.4	96.1	2.2	1.7	24.7	1.44	6.6	1.0	1.0
-3	25-58	E2	0.0	0.2	4.6	88.4	3.2	96.4	1.6	2.0	30.3	1.45	5.1	3.1	0.7
-4	58-99	E3	0.0	0.2	4.4	88.9	3.4	96.9	1.3	1.8	42.7	1.44	5.4	3.4	0.6
-5	99-173	E4	0.0	0.1	3.6	92.1	3.0	98.8	0.2	1.0	36.8	1.47	4.4	3.6	0.1
-6	173-196	Bh1	0.0	0.0	2.2	94.5	2.5	99.2	0.1	0.7	31.6	1.47	4.0	2.1	0.2
-7	196-203	Bh2	0.0	0.2	3.3	90.4	4.4	98.3	0.7	1.0	18.4	1.50	6.4	3.8	0.4
Kershaw fine sand:															
S45-6-1	0-18	A	0.0	0.0	3.0	92.0	1.5	96.5	1.1	2.4	42.7	1.42	5.7	3.8	0.9
-2	18-76	C1	0.0	0.0	3.3	91.2	1.6	96.1	1.8	2.1	25.6	1.54	4.9	3.1	0.8
-3	76-147	C2	0.0	0.0	3.2	92.4	1.7	97.3	0.4	2.3	37.5	1.46	3.9	2.7	0.7
-4	147-203	C3	0.0	0.0	2.8	91.3	2.0	96.1	2.0	1.9	31.6	1.49	3.1	2.1	0.5

TABLE 15.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution								Hydraulic conductivity	Bulk density (field moist)	Water content		
			Sand						Silt (0.05-0.002 mm)	Clay (<0.002 mm)			1/10 bar	1/3 bar	15 bar
			Very coarse (2.0-1.0 mm)	Coarse (1.0-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)							
	Cm		Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Cm/hr	g/cm	Pct (wt)		
Kingsferry fine sand:															
S45-28-1	0-28	A1	0.0	0.1	4.9	84.8	5.3	95.1	3.6	1.3	11.0	1.47	12.5	7.0	1.8
-2	28-43	A2	0.0	0.1	4.5	83.2	5.3	93.1	5.5	1.4	14.1	1.50	16.0	9.2	1.3
-3	43-86	A3	0.0	0.1	5.2	82.6	4.4	92.3	5.4	2.3	9.9	1.53	12.1	6.9	1.0
-4	86-109	Bh1	0.0	0.1	5.6	82.4	4.1	92.2	5.1	2.7	5.3	1.60	12.8	8.6	1.8
-5	109-170	Bh2	0.0	0.0	4.9	82.5	2.8	90.2	6.9	2.9	7.0	1.40	25.2	17.8	3.2
-6	170-203	Bh3	0.0	0.0	3.4	86.7	3.3	93.4	4.4	2.2	1.2	1.38	24.2	17.7	3.8
Kureb fine sand:															
S45-19-1	0-13	A	0.0	0.3	6.0	89.6	2.8	98.7	0.9	0.4	41.4	1.31	7.7	4.9	1.4
-2	13-48	E	0.0	0.4	6.4	88.9	2.4	98.1	1.2	0.7	39.4	1.37	4.4	2.3	0.4
-3	48-76	C/Bh	0.0	0.3	5.3	85.4	2.5	93.5	3.6	2.9	40.1	1.32	10.0	7.1	2.6
-4	76-107	C1	0.0	0.3	5.8	87.4	2.3	95.8	2.6	1.6	53.2	1.40	16.0	13.9	1.3
-5	107-140	C2	0.0	0.3	5.5	87.6	2.7	96.1	2.0	1.9	59.2	1.40	4.0	2.2	0.8
-6	140-152	C3	0.0	0.3	5.8	88.2	2.6	96.9	1.6	1.5	65.7	1.40	13.7	12.0	0.5
-7	152-165	C4	0.0	0.3	5.2	89.8	2.7	98.0	1.2	0.8	71.7	1.45	2.8	1.5	0.5
-8	165-203	C5	0.0	0.2	4.4	91.3	2.6	98.5	0.7	0.8	63.8	1.48	3.0	1.5	0.3
Leefield fine sand:															
S45-29-1	0-13	A	0.0	0.1	1.2	65.7	22.8	89.8	7.5	2.7	15.1	1.34	13.8	7.3	2.2
-2	13-36	E1	0.0	0.1	1.1	67.7	21.4	90.3	7.0	2.7	10.7	1.51	9.8	4.5	1.3
-3	36-58	E2	0.0	0.1	1.2	68.2	22.7	92.2	5.5	2.3	15.1	1.51	7.1	3.2	0.8
-4	58-74	E/B	0.0	0.1	1.0	63.9	21.1	86.1	6.7	7.2	8.8	1.54	9.6	5.7	2.3
-5	74-84	Btv	0.0	0.0	1.0	55.7	21.2	77.9	7.2	14.9	1.9	1.65	13.5	9.4	5.4
-6	84-112	Btg1	0.0	0.0	1.1	50.2	14.3	65.6	5.3	29.1	0.9	1.64	18.4	16.2	9.1
-7	112-203	Btg2	0.0	0.0	0.5	31.5	29.2	61.2	6.9	31.9	0.2	1.65	22.2	20.3	13.0
Leon fine sand:															
S45-27-1	0-18	A	0.0	0.1	2.1	86.5	6.0	94.7	4.5	0.8	72.3	1.08	19.2	12.8	3.4
-2	18-46	E	0.0	0.0	2.6	87.6	6.1	96.3	2.9	0.8	17.4	1.51	5.9	2.7	0.4
-3	46-53	Bh1	0.0	0.0	2.3	82.0	5.7	90.0	6.0	4.0	29.4	1.29	33.3	25.1	5.2
-4	53-79	Bh2	0.0	0.0	2.6	84.0	5.1	91.5	4.7	3.8	12.7	1.40	14.1	10.0	2.4
-5	79-94	E'	0.0	0.0	2.4	87.9	6.0	96.3	2.5	1.2	21.0	1.57	6.4	3.2	0.4
-6	94-112	B'h1	0.0	0.0	2.4	81.4	4.9	88.7	6.9	4.4	8.6	1.57	16.2	10.9	3.7
-7	112-203	B'h2	0.0	0.0	2.6	88.2	4.0	94.8	3.2	2.0	3.3	1.56	19.8	12.7	2.1
Leon fine sand, tidal:															
S45-9-1	0-20	A1	0.0	0.4	3.7	87.2	5.5	96.8	1.1	2.1	16.4	1.42	12.3	7.4	1.3
-2	20-66	A2	0.1	0.4	3.9	84.2	4.9	93.5	3.9	2.6	5.9	1.52	11.6	6.3	0.9
-3	66-91	Bh1	0.0	0.6	4.4	80.6	4.6	90.2	5.9	3.9	2.1	1.44	20.0	12.8	2.1
-4	91-102	Bh2	0.1	0.6	5.9	80.4	4.1	91.1	2.7	6.2	1.8	1.61	15.7	10.7	2.4
-5	102-109	E	0.1	1.2	11.0	80.5	3.3	96.1	1.2	2.7	21.7	1.58	4.4	2.4	0.4
-6	109-150	B'h	0.6	3.0	13.1	66.6	5.1	88.4	2.7	9.2	4.5	1.77	15.7	11.2	1.8
-7	150-203	C	0.2	1.3	3.6	81.9	7.8	94.8	1.2	4.0	0.3	1.62	17.1	8.5	1.4

TABLE 15.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution								Hydraulic conductivity	Bulk density (field moist)	Water content		
			Sand						Silt (0.05-0.002 mm)	Clay (<0.002 mm)			1/10 bar	1/3 bar	15 bar
			Very coarse (2.0-1.0 mm)	Coarse (1.0-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)							
	Cm		Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Cm/hr	g/cm	Pct (wt)		
Mandarin fine sand:															
S45-10-1	0-15	A	0.0	0.3	4.5	90.0	3.3	98.1	1.3	0.6	37.5	1.32	9.3	6.6	1.8
-2	15-30	E1	0.0	0.2	4.5	90.0	3.2	97.9	1.7	0.4	36.2	1.44	4.1	2.7	0.6
-3	30-51	E2	0.0	0.2	4.3	90.0	3.4	97.9	1.6	0.5	38.1	1.43	3.9	2.3	0.4
-4	51-56	Bh1	0.0	0.2	3.7	87.2	3.0	94.1	2.6	3.3	6.5	1.24	23.3	18.0	4.8
-5	56-64	Bh2	0.0	0.2	3.6	85.4	3.2	92.4	3.4	4.2	14.8	1.34	14.8	11.2	3.2
-6	64-79	Bh3	0.0	0.2	3.8	87.7	3.2	94.9	2.9	2.2	26.3	1.47	6.7	4.4	1.0
-7	79-150	BC	0.0	0.2	3.9	90.1	3.6	97.8	1.0	1.2	23.7	1.52	4.3	2.5	0.5
-8	150-203	C	0.0	0.2	2.5	93.7	3.0	99.4	0.3	0.3	32.9	1.47	3.4	2.5	0.1
Meadowbrook fine sand:															
S45-25-1	0-20	A	0.0	0.2	1.0	65.3	24.0	90.5	6.9	2.6	35.2	1.20	30.0	16.5	3.8
-2	20-36	E1	0.0	0.2	1.0	64.9	24.4	90.5	8.2	1.3	7.4	1.41	14.6	7.2	1.1
-3	36-76	E2	0.0	0.2	0.9	67.3	22.2	90.6	7.6	1.8	8.0	1.44	15.2	7.0	1.3
-4	76-112	E3	0.0	0.1	0.7	64.9	25.6	91.3	8.1	0.6	6.4	1.57	9.3	3.7	0.4
-5	112-155	Btg1	0.0	0.1	0.4	42.4	18.2	61.1	8.3	30.6	1.0	1.44	26.5	20.6	9.2
-6	155-203	Btg2	0.0	0.0	0.2	40.8	17.5	58.5	9.3	32.2	2.3	1.57	25.3	21.7	9.8
Meggett loamy fine sand:															
S45-18-1	0-15	A1	0.0	0.3	1.6	58.5	25.5	85.9	9.2	4.9	1.4	1.52	19.2	17.1	2.5
-2	15-30	A2	0.0	0.2	1.6	55.2	29.0	86.0	8.6	5.4	0.7	1.56	16.5	14.6	2.4
-3	30-41	E	0.0	0.4	1.8	54.6	29.4	86.2	8.7	5.1	0.4	1.56	14.9	12.9	2.2
-4	41-71	Btg1	0.0	0.2	1.2	37.6	20.8	59.8	9.6	30.6	2.8	1.41	33.6	31.7	14.0
-5	71-119	Btg2	0.0	0.2	0.8	20.2	19.4	40.6	11.9	47.5	0.0	1.39	33.6	33.4	18.0
-6	119-173	Btg3	0.0	0.8	3.2	38.6	19.2	61.8	8.1	30.1	0.0	1.58	26.7	26.6	15.4
-7	173-203	Btg4	0.0	0.4	2.8	34.4	15.6	53.2	17.6	29.2	0.0	1.58	26.8	26.6	14.7
Newhan fine sand:															
S45-2-1	0-20	A	0.0	0.0	3.8	91.5	4.2	99.5	0.2	0.3	48.0	1.44	3.0	2.1	0.9
-2	20-76	C	0.0	0.1	5.8	90.4	3.3	99.6	0.1	0.3	46.0	1.50	3.8	2.8	0.8
-3	76-140	C	0.0	0.4	14.5	81.9	2.6	99.4	0.0	0.6	48.0	1.46	2.9	1.7	0.5
-4	140-203	C	0.0	0.3	11.5	83.2	4.5	99.5	0.1	0.4	43.4	1.52	2.5	1.5	0.7
Ocilla fine sand:															
S45-23-1	0-18	Ap	0.2	2.3	10.8	71.8	8.1	93.2	5.2	1.6	20.7	1.42	10.2	6.7	1.4
-2	18-51	E1	0.7	2.7	11.1	70.2	7.6	92.3	5.4	2.3	14.1	1.50	7.8	4.4	1.0
-3	51-86	E2	0.6	2.2	10.1	71.5	8.1	92.5	5.3	2.2	17.4	1.54	7.5	4.3	0.9
-4	86-94	BE	0.4	2.6	11.1	62.9	6.7	83.7	6.1	10.2	2.0	1.69	14.4	11.0	4.6
-5	94-119	Btg1	0.2	1.8	11.3	53.6	3.3	70.2	6.6	23.7	0.2	1.61	19.4	16.7	8.1
-6	119-145	Btg2	0.0	0.9	9.2	60.6	3.0	73.7	3.8	22.5	0.3	1.70	17.9	15.0	7.1
-7	145-203	Btg3	0.0	0.7	12.5	63.4	1.7	78.3	2.1	19.6	0.2	1.71	17.4	15.9	7.4

TABLE 15.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution								Hydraulic conductivity	Bulk density (field moist)	Water content		
			Sand						Silt (0.05-0.002 mm)	Clay (<0.002 mm)			1/10 bar	1/3 bar	15 bar
			Very coarse (2.0-1.0 mm)	Coarse (1.0-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)							
	Cm		Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Cm/hr	g/cm	Pct (wt)		
Ortega fine sand:															
S45-5-1	0-15	A	0.0	0.0	1.2	90.2	3.8	95.2	2.0	2.8	42.1	1.22	10.6	7.4	1.7
-2	15-38	C1	0.0	0.0	1.2	88.2	6.1	95.5	2.7	1.8	33.5	1.40	6.4	4.2	1.0
-3	38-58	C2	0.0	0.0	1.2	89.8	5.0	96.0	1.5	2.5	37.5	1.43	5.2	3.3	0.8
-4	58-71	C3	0.0	0.0	1.2	90.2	4.5	95.9	1.6	2.5	35.5	1.45	4.7	2.8	0.8
-5	71-104	C4	0.0	0.0	1.1	90.2	4.9	96.2	1.2	2.6	31.6	1.48	4.4	2.6	0.7
-6	104-155	C5	0.0	0.0	1.1	91.2	4.5	96.8	0.8	2.4	30.2	1.50	4.3	2.7	0.6
-7	155-203	C6	0.0	0.0	1.6	91.9	5.6	99.1	0.1	0.8	31.2	1.54	3.0	---	---
Osier loamy fine sand:															
S45-31-1	0-13	A1	0.0	0.0	0.7	62.4	22.3	85.4	9.3	5.3	32.9	1.20	20.2	14.3	2.5
-2	13-36	A2	0.0	0.0	0.8	68.6	15.7	85.1	9.5	5.4	12.5	1.31	14.9	9.7	1.7
-3	36-79	Cg1	0.0	0.0	0.9	76.4	16.1	93.4	3.8	2.8	14.8	1.39	9.8	5.8	1.6
-4	79-96	Cg2	0.0	0.0	0.7	79.2	15.2	95.1	2.9	2.0	8.9	1.52	9.9	4.2	1.1
-5	96-109	Cg3	0.0	0.0	0.5	75.3	21.0	96.8	2.4	0.8	12.3	1.51	6.4	2.1	0.8
-6	109-117	Cg4	0.0	0.0	0.2	75.4	17.4	93.0	2.2	4.8	0.9	1.54	14.4	7.8	2.4
-7	117-127	Cg5	0.0	0.0	0.3	69.9	14.5	84.7	4.0	11.3	0.4	1.57	17.6	11.2	3.7
-8	127-203	Cg6	0.0	0.0	1.0	79.2	14.2	94.4	3.0	2.6	9.6	1.55	6.5	3.0	0.9
Penney fine sand:															
S45-30-1	0-13	A	0.0	0.3	4.4	78.2	11.4	94.3	4.1	1.6	46.5	1.20	10.1	6.0	2.6
-2	13-38	E1	0.0	0.2	3.5	82.4	7.8	93.9	4.3	1.8	34.4	1.36	10.7	3.5	0.9
-3	38-76	E2	0.0	0.3	3.2	80.3	10.6	94.4	4.0	1.6	25.6	1.41	11.8	2.8	0.7
-4	76-104	E3	0.0	0.2	3.5	82.1	9.2	95.0	3.8	1.2	23.0	1.45	5.4	2.3	0.5
-5	104-137	E/B	0.0	0.2	3.1	82.8	9.2	95.3	3.4	1.3	21.7	1.42	5.5	2.3	0.5
-6	137-203	EB	0.0	0.2	3.2	83.0	8.3	94.7	3.0	2.3	28.3	1.41	5.7	3.0	1.0
Resota fine sand:															
S45-3-1	0-10	A	0.0	0.0	1.0	93.8	4.1	98.9	0.6	0.5	35.5	1.36	8.4	5.6	2.6
-2	10-18	E1	0.0	0.0	1.0	93.0	3.8	97.8	1.4	0.8	28.3	1.49	4.2	2.1	0.5
-3	18-58	E2	0.0	0.0	0.9	93.4	3.8	98.1	1.4	0.5	42.1	1.43	3.5	1.9	0.6
-4	58-68	E3	0.0	0.0	1.0	92.4	4.3	97.7	1.7	0.6	40.1	1.42	4.2	2.1	0.6
-5	68-79	Bw1	0.0	0.0	0.8	89.5	3.7	94.0	2.8	3.2	57.9	1.32	11.4	8.8	1.6
-6	79-127	Bw2	0.0	0.0	0.7	90.4	4.5	95.6	2.7	1.7	44.0	1.43	8.1	5.8	0.7
-7	127-203	Bw3	0.0	0.0	0.7	92.8	4.0	97.5	1.6	0.9	33.5	1.50	5.1	2.8	0.5
Ridgewood fine sand:															
S45-4-1	0-18	Ap	0.0	0.0	2.3	92.4	1.6	96.3	1.4	2.3	32.9	1.33	7.9	5.4	1.3
-2	18-61	Bw	0.0	0.0	2.1	89.0	4.5	95.6	2.3	2.1	25.0	1.42	6.0	3.8	0.8
-3	61-74	C1	0.0	0.1	2.3	89.8	3.9	96.1	1.9	2.0	23.7	1.47	5.1	3.2	0.7
-4	74-89	C2	0.0	0.0	2.1	90.0	4.4	96.5	1.9	1.6	28.9	1.48	4.5	2.8	0.5
-5	89-117	C3	0.0	0.0	2.1	92.0	3.5	97.6	1.4	1.0	29.3	1.53	3.6	2.3	0.2
-6	117-203	C4	0.0	0.0	2.0	93.5	3.1	98.6	0.8	0.6	30.0	1.54	3.2	2.0	0.1

TABLE 15.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution								Hydraulic conductivity	Bulk density (field moist)	Water content		
			Sand						Silt (0.05-0.002 mm)	Clay (<0.002 mm)					
			Very coarse (2.0-1.0 mm)	Coarse (1.0-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)					1/10 bar	1/3 bar	15 bar
	Cm		Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Cm/hr	g/cm	Pct (wt)		
Sapelo fine sand:															
S45-21-1	0-15	A	0.0	0.4	6.5	78.1	8.6	93.6	4.4	2.0	362.0	0.99	24.4	16.8	8.2
-2	15-25	E1	0.0	0.7	7.1	80.1	8.1	96.0	3.4	0.6	22.0	1.40	8.9	4.8	1.3
-3	25-53	E2	0.0	1.0	7.1	79.7	8.3	96.1	3.4	0.5	17.7	1.51	5.4	2.7	0.6
-4	53-68	Bh	0.1	0.6	5.3	75.5	8.8	90.3	4.6	5.1	7.0	1.01	43.3	34.4	11.0
-5	68-109	E'	0.0	0.6	6.0	75.0	6.9	88.5	4.1	7.4	8.6	1.47	19.0	12.0	6.4
-6	109-137	Btg1	0.0	0.4	5.5	62.7	4.8	73.4	5.2	21.4	3.0	1.55	20.3	17.1	9.6
-7	137-175	Btg2	0.0	0.5	6.6	59.5	4.4	71.0	5.3	23.7	2.1	1.61	21.0	17.9	8.9
-8	175-203	C	0.0	0.2	3.5	78.6	5.0	87.3	2.1	10.6	3.6	1.61	14.8	10.8	3.9

TABLE 16.--CHEMICAL ANALYSES OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Extractable bases					Extractable acidity	Sum of cations	Base saturation	Organic carbon	Electrical conductivity	pH			Pyrophosphate extractable			Citrate-dithionite extractable	
			Ca	Mg	Na	K	Sum						H_2O (1:1)	$CaCl_2$ 0.1m (1:2)	KCl in (1:1)	C	Fe	Al	Fe	Al
	Cm		----Milliequivalents/100 grams of soil-----							Pct	Pct	Mmhos/cm				Pct	Pct	Pct	Pct	Pct
Albany fine sand:																				
S45-7-1	0-5	A	0.52	0.13	0.03	0.03	0.71	7.47	8.18	9	1.55	0.00	4.9	4.7	4.3	---	---	---	---	---
-2	5-13	E1	0.15	0.04	0.03	0.01	0.23	4.33	4.56	5	0.57	0.00	4.9	4.7	4.7	---	---	---	---	---
-3	13-43	E2	0.14	0.04	0.03	0.01	0.22	2.77	2.99	7	0.30	0.00	5.6	4.9	4.9	---	---	---	---	---
-4	43-91	E3	0.07	0.03	0.02	0.01	0.13	2.06	2.19	6	0.22	0.00	5.1	4.9	4.9	---	---	---	---	---
-5	91-127	E4	0.07	0.03	0.03	0.00	0.13	1.05	1.18	11	0.13	0.00	5.1	4.8	4.8	---	---	---	---	---
-6	127-142	BE	0.44	0.33	0.08	0.06	0.91	6.39	7.30	12	0.10	0.00	4.6	4.2	4.3	---	---	---	0.78	0.16
-7	142-157	Btg1	0.60	0.66	0.12	0.08	1.46	9.56	11.02	13	0.22	0.00	4.4	4.0	4.1	---	---	---	0.91	0.19
-8	157-203	Btg2	0.33	0.37	0.21	0.06	0.97	8.59	9.56	10	0.10	0.00	4.3	3.9	4.1	---	---	---	0.38	0.14
Boulogne fine sand:																				
S45-15-1	0-18	Ap	0.16	0.07	0.17	0.01	0.41	25.21	25.62	2	1.25	0.00	4.4	3.7	3.4	---	---	---	---	---
-2	18-25	A	0.05	0.03	0.10	0.00	0.18	8.57	8.75	2	0.38	0.00	4.4	3.7	3.5	---	---	---	---	---
-3	25-33	Bh	0.03	0.02	0.11	0.00	0.16	6.29	6.45	2	1.05	0.00	4.9	4.2	4.1	1.05	0.03	0.17	0.06	0.14
-4	33-48	E1	0.02	0.01	0.08	0.00	0.11	1.86	1.97	6	0.48	0.00	5.0	4.5	4.5	---	---	---	---	---
-5	48-66	E2	0.01	0.01	0.07	0.00	0.09	2.96	3.05	3	0.34	0.00	4.8	4.6	4.5	---	---	---	---	---
-6	66-84	E3	0.02	0.01	0.07	0.00	0.10	0.88	0.98	10	0.08	0.00	5.0	4.9	4.8	---	---	---	---	---
-7	84-102	B'h1	0.03	0.02	0.08	0.00	0.13	4.23	4.36	3	0.32	0.00	4.5	4.4	4.5	0.25	0.08	0.10	0.16	0.11
-8	102-137	B'h2	0.02	0.02	0.07	0.00	0.11	16.10	16.21	1	1.33	0.00	4.8	4.5	4.4	1.54	0.09	0.42	0.12	0.24
-9	137-203	B'h3	0.02	0.02	0.09	0.00	0.13	25.30	25.43	1	2.01	0.00	4.6	4.4	4.3	1.69	0.02	0.62	0.04	0.45
Buccaneer clay:																				
S45-17-1	0-13	A	25.25	19.34	0.67	0.15	45.51	16.52	61.93	73	1.70	0.00	5.9	5.4	5.0	---	---	---	---	---
-2	13-51	Btg1	33.25	25.92	0.85	0.17	60.19	15.79	75.98	79	0.84	0.00	7.3	6.2	6.3	---	---	---	---	---
-3	51-81	Btg2	27.75	21.81	0.71	0.16	66.27	15.37	81.64	81	0.35	0.00	7.2	6.3	5.9	---	---	---	0.18	0.04
-4	81-122	Btg3	27.00	22.63	0.74	0.29	50.66	14.35	65.01	78	0.26	0.00	7.1	6.3	5.6	---	---	---	0.19	0.04
-5	122-185	Btg4	24.50	21.40	0.68	0.35	46.93	14.75	61.88	76	0.09	0.00	7.1	6.3	5.5	---	---	---	0.24	0.03
-6	185-203	Cg	21.50	19.34	0.69	0.58	42.11	15.21	57.32	73	0.09	0.00	7.0	6.3	5.4	---	---	---	0.66	0.03
Centenary fine sand:																				
S45-8-1	0-8	A1	0.11	0.05	0.03	0.02	0.21	3.48	3.69	6	0.91	0.00	4.6	4.2	4.2	---	---	---	---	---
-2	8-18	A2	0.03	0.02	0.03	0.00	0.08	2.38	2.46	3	0.63	0.00	6.1	4.7	4.5	---	---	---	---	---
-3	18-66	E1	0.02	0.02	0.04	0.00	0.07	0.55	0.62	11	0.29	0.00	5.0	4.8	4.9	---	---	---	---	---
-4	66-91	E2	0.01	0.01	0.02	0.00	0.04	0.09	0.13	31	0.19	0.02	4.5	4.7	4.8	---	---	---	---	---
-5	91-117	E3	0.09	0.23	0.91	0.03	1.26	0.00	1.26	100	0.15	0.00	4.4	4.8	5.0	---	---	---	---	---
-6	117-152	E4	0.04	0.02	0.02	0.00	0.08	0.00	0.08	100	0.15	0.01	4.4	4.9	4.9	---	---	---	---	---
-7	152-178	Bh1	0.02	0.02	0.03	0.01	0.08	1.65	1.73	5	0.50	0.02	4.3	4.7	4.8	0.00	0.01	0.09	0.10	0.08
-8	178-203	Bh2	0.02	0.01	0.02	0.00	0.05	3.02	3.07	2	0.72	0.00	4.2	4.8	4.9	0.32	0.01	0.24	0.06	0.18

TABLE 16.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases					Extractable acidity	Sum of cations	Base saturation	Organic carbon	Electrical conductivity	pH			Pyrophosphate extractable			Citrate-dithionite extractable	
			Ca	Mg	Na	K	Sum						H_2O (1:1)	$CaCl_2$ 0.1m (1:2)	KCl in (1:1)	C	Fe	Al	Fe	Al
	Cm		----Milliequivalents/100 grams of soil-----							Pct	Pct	Mmhos/cm				Pct	Pct	Pct	Pct	Pct
Chaires fine sand:																				
S45-16-1	0-18	A	0.97	0.66	0.30	0.06	1.99	11.77	13.76	14	2.17	0.00	4.3	3.5	3.1	---	---	---	---	---
-2	18-46	E1	0.06	0.05	0.08	0.00	0.19	1.57	1.76	11	0.27	0.00	4.7	3.7	3.5	---	---	---	---	---
-3	46-58	E2	0.05	0.03	0.07	0.00	0.15	1.14	1.29	12	0.13	0.00	5.1	3.8	3.6	---	---	---	---	---
-4	58-74	Bh1	0.10	0.08	0.16	0.00	0.34	15.07	15.41	2	1.45	0.01	4.2	3.7	3.6	0.98	0.02	0.16	0.03	0.14
-5	74-91	Bh2	0.04	0.03	0.11	0.00	0.18	14.64	14.82	1	0.95	0.00	4.5	4.1	4.0	0.86	0.02	0.22	0.03	0.20
-6	91-96	E'	0.04	0.03	0.07	0.00	0.14	1.00	1.14	12	0.08	0.01	5.3	4.4	4.4	---	---	---	---	---
-7	96-140	Btg1	3.77	3.17	0.44	0.12	7.50	14.23	21.73	35	0.18	0.02	4.7	3.9	3.4	---	---	---	2.77	0.22
-8	140-165	Btg2	8.97	7.82	0.69	0.20	17.68	13.38	31.51	56	0.07	0.02	4.8	3.9	3.2	---	---	---	0.34	0.07
-9	165-203	Btg3	9.15	8.23	0.71	0.22	18.31	11.78	30.09	61	0.04	0.00	5.0	4.1	3.4	---	---	---	0.17	0.05
Chaires fine sand:																				
S45-22-1	0-18	A	0.36	0.15	0.07	0.02	0.60	9.03	9.63	6	1.66	0.04	3.9	3.5	3.3	---	---	---	---	---
-2	18-46	E	0.05	0.02	0.03	0.00	0.10	0.41	0.51	20	0.15	0.01	4.5	4.2	4.2	---	---	---	---	---
-3	46-56	Bh1	0.18	0.09	0.06	0.01	0.34	19.53	19.87	2	2.40	0.04	4.1	3.8	4.1	1.39	0.03	0.19	0.06	0.14
-4	56-68	Bh2	0.05	0.02	0.05	0.00	0.12	18.20	18.32	1	1.30	0.03	4.7	4.3	4.2	1.25	0.01	0.25	0.10	0.22
-5	68-79	BE	0.07	0.03	0.05	0.00	0.15	10.16	10.31	1	0.73	0.02	5.0	4.5	4.4	---	---	---	---	---
-6	79-91	Btg1	0.21	0.57	0.08	0.05	0.91	11.24	12.15	7	0.26	0.02	4.7	4.0	4.1	---	---	---	0.96	0.26
-7	91-127	Btg2	0.32	0.99	0.08	0.09	1.48	11.96	13.44	11	0.18	0.03	4.7	3.2	3.6	---	---	---	1.88	0.30
-8	127-165	Btg3	0.46	1.15	0.08	0.07	1.76	8.96	2.72	65	0.11	0.02	5.2	3.6	3.9	---	---	---	3.00	0.32
-9	165-203	Btg4	1.47	1.73	0.12	0.13	3.45	8.50	11.95	29	0.08	0.02	5.2	3.5	3.7	---	---	---	0.76	0.14
Corolla fine sand:																				
S45-20-1	0-15	A	2.37	0.08	0.06	0.01	2.52	3.22	5.74	44	0.13	0.02	6.4	6.4	6.8	---	---	---	---	---
-2	15-30	C1	3.72	0.06	0.08	0.00	3.86	3.12	6.98	55	0.12	0.03	6.9	7.4	7.3	---	---	---	---	---
-3	30-51	C2	7.35	0.06	0.10	0.00	7.51	2.93	10.44	72	0.09	0.03	7.2	7.5	7.9	---	---	---	---	---
-4	51-66	C3	12.25	0.03	0.12	0.00	12.40	2.49	14.89	83	0.09	0.03	7.3	7.4	7.9	---	---	---	---	---
-5	66-104	C4	20.25	0.06	0.17	0.01	20.49	0.09	20.58	99	0.07	0.03	7.2	7.3	7.7	---	---	---	---	---
-6	104-203	C5	14.75	0.04	0.14	0.00	14.93	0.42	15.35	97	0.05	0.03	7.6	7.4	8.2	---	---	---	---	---
Echaw fine sand:																				
S45-13-1	0-15	A	0.79	0.58	0.27	0.11	1.75	11.90	13.65	13	3.87	0.03	3.9	3.3	2.8	---	---	---	---	---
-2	15-51	E1	0.03	0.02	0.07	0.00	0.12	1.87	1.99	6	0.11	0.01	4.7	3.9	3.7	---	---	---	---	---
-3	51-89	E2	0.02	0.02	0.07	0.00	0.11	1.27	1.38	8	0.12	0.02	4.6	4.1	3.8	---	---	---	---	---
-4	89-96	Bh	0.05	0.05	0.17	0.02	0.29	20.99	21.28	1	1.92	0.00	4.1	3.8	3.7	1.08	0.02	0.30	0.07	0.22
-5	96-109	E'1	0.04	0.03	0.12	0.00	0.19	4.18	4.37	4	0.50	0.00	4.5	4.5	4.4	---	---	---	---	---
-6	109-137	E'2	0.02	0.02	0.09	0.00	0.13	3.50	3.63	4	0.27	0.00	4.5	4.6	4.5	---	---	---	---	---
-7	137-183	E'3	0.01	0.01	0.09	0.00	0.11	2.07	2.18	5	0.14	0.00	4.5	4.6	4.6	---	---	---	---	---
-8	183-206	E'4	0.03	0.02	0.08	0.00	0.13	3.26	3.39	4	0.21	0.00	4.6	4.6	4.5	0.11	0.00	0.08	0.05	0.07
-9	206-231	B'h	0.02	0.01	0.08	0.00	0.11	4.58	4.69	2	0.42	0.00	4.5	4.6	4.5	0.36	0.00	0.12	0.04	0.10

TABLE 16.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases					Extractable acidity	Sum of cations	Base saturation	Organic carbon	Electrical conductivity	pH			Pyrophosphate extractable			Citrate-dithionite extractable	
			Ca	Mg	Na	K	Sum						H_2O (1:1)	$CaCl_2$ 0.1m (1:2)	KCl in (1:1)	C	Fe	Al	Fe	Al
	Cm		----Milliequivalents/100 grams of soil-----							Pct	Pct	Mmhos/cm				Pct	Pct	Pct	Pct	Pct
Evergreen muck:																				
S45-14-1	0-8	Oe	3.85	5.35	0.91	0.40	10.51	117.87	128.38	8	48.00	0.01	3.6	3.2	2.8	---	---	---	---	---
-2	8-28	Oa	0.25	0.90	0.80	0.11	2.06	84.56	86.62	2	16.75	0.00	3.8	3.2	2.9	---	---	---	---	---
-3	28-36	A1	0.05	0.14	0.38	0.02	0.59	42.23	42.82	1	5.53	0.05	3.9	3.4	3.1	---	---	---	---	---
-4	36-43	A2	0.02	0.07	0.27	0.01	0.37	16.93	17.30	2	2.55	0.00	4.1	3.7	3.4	---	---	---	---	---
-5	43-66	E	0.02	0.03	0.14	0.00	0.19	2.43	2.62	7	0.24	0.00	4.6	4.1	3.9	---	---	---	---	---
-6	66-140	Bh1	0.03	0.05	0.20	0.00	0.28	15.95	16.23	2	2.61	0.02	4.6	4.3	4.1	1.40	0.00	0.35	0.02	0.05
-7	140-203	Bh2	0.01	0.02	0.14	0.00	0.17	1.86	2.03	8	0.44	0.00	4.6	4.6	4.4	0.84	0.00	0.18	0.06	0.13
Fripp fine sand:																				
S45-1-1	0-10	A	0.34	0.22	0.03	0.01	0.60	0.00	0.60	100	0.20	0.04	6.5	6.7	5.6	---	---	---	---	---
-2	10-76	C	0.19	0.12	0.02	0.00	0.33	0.00	0.33	100	0.08	0.05	7.0	6.3	5.7	---	---	---	---	---
-3	76-140	C	0.32	0.07	0.03	0.01	0.43	0.00	0.43	100	0.09	0.09	6.7	6.3	5.7	---	---	---	---	---
-4	140-203	C	0.36	0.06	0.02	0.00	0.44	0.00	0.44	100	0.04	0.04	6.4	6.4	6.0	---	---	---	---	---
Goldhead fine sand:																				
S45-24-1	0-20	A	0.05	0.08	0.08	0.01	0.22	7.95	8.17	3	1.38	0.09	3.9	3.5	3.4	---	---	---	---	---
-2	20-41	E1	0.07	0.14	0.04	0.00	0.25	1.72	1.97	13	0.20	0.02	5.0	4.3	4.0	---	---	---	---	---
-3	41-84	E2	0.06	0.09	0.03	0.00	0.18	1.40	1.58	11	0.13	0.21	4.8	4.5	4.1	---	---	---	---	---
-4	84-168	Btg	4.72	8.23	0.20	0.28	13.43	15.81	29.24	46	0.10	0.02	4.6	3.3	2.9	---	---	---	1.24	0.16
-5	168-203	C	1.65	2.43	0.09	0.11	4.28	5.61	9.89	43	0.07	0.03	4.7	3.4	3.5	---	---	---	---	---
Goldhead fine sand:																				
S45-26-1	0-15	A	0.09	0.07	0.10	0.02	0.28	8.58	8.86	3	1.65	0.07	4.2	3.5	3.5	---	---	---	---	---
-2	15-30	E1	0.04	0.02	0.04	0.01	0.11	4.50	4.61	2	0.66	0.04	4.4	4.0	4.1	---	---	---	---	---
-3	30-84	E2	0.06	0.05	0.22	0.01	0.34	4.23	4.57	7	0.32	0.03	4.7	4.3	4.3	---	---	---	---	---
-4	84-135	Btg1	1.92	2.26	0.15	0.14	4.47	11.12	15.59	29	0.17	0.03	4.8	3.6	3.6	---	---	---	2.16	0.22
-5	135-203	Btg2	3.57	3.70	0.18	0.18	7.63	10.94	18.57	41	0.07	0.03	4.9	3.7	3.5	---	---	---	1.04	0.16
Hurricane fine sand:																				
S45-11-1	0-13	Ap	0.18	0.06	0.03	0.01	0.28	4.85	5.13	5	0.86	0.03	4.3	4.0	4.1	---	---	---	---	---
-2	13-25	E1	0.05	0.01	0.02	0.00	0.08	2.70	2.78	3	0.38	0.03	4.5	4.7	4.7	---	---	---	---	---
-3	25-58	E2	0.03	0.01	0.03	0.00	0.07	1.79	1.86	4	0.28	0.02	4.5	4.8	4.8	---	---	---	---	---
-4	58-99	E3	0.02	0.02	0.02	0.00	0.06	0.93	0.99	6	0.12	0.02	4.4	4.8	4.9	---	---	---	---	---
-5	99-173	E4	0.01	0.01	0.01	0.00	0.03	0.04	0.07	75	0.02	0.02	4.5	4.9	5.0	---	---	---	---	---
-6	173-196	Bh1	0.02	0.01	0.02	0.00	0.05	0.58	0.63	8	0.07	0.02	4.4	4.8	4.8	0.04	0.13	0.03	0.01	0.03
-7	196-203	Bh2	0.02	0.01	0.02	0.00	0.05	3.54	3.59	1	0.26	0.03	4.2	4.7	4.7	0.20	0.06	0.11	0.01	0.12

TABLE 16.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases					Extractable acidity	Sum of cations	Base saturation	Organic carbon	Electrical conductivity	pH			Pyrophosphate extractable			Citrate-dithionite extractable	
			Ca	Mg	Na	K	Sum						H_2O (1:1)	$CaCl_2$ 0.1m (1:2)	KCl in (1:1)	C	Fe	Al	Fe	Al
	Cm		----Milliequivalents/100 grams of soil-----							Pct	Pct	Mmhos/cm				Pct	Pct	Pct	Pct	Pct
Kershaw fine sand:																				
S45-6-1	0-18	A	0.28	0.08	0.03	0.02	0.41	4.58	4.99	8	0.99	0.00	4.8	4.5	4.5	---	---	---	---	---
-2	18-76	C1	0.07	0.04	0.02	0.00	0.13	2.88	3.01	4	0.39	0.00	5.0	4.7	4.7	---	---	---	---	---
-3	76-147	C2	0.07	0.04	0.02	0.00	0.13	1.73	1.86	7	0.16	0.00	4.9	4.6	4.8	---	---	---	---	---
-4	147-203	C3	0.04	0.03	0.01	0.00	0.08	1.23	1.31	6	0.10	0.00	5.0	4.7	4.8	---	---	---	---	---
Kingsferry fine sand:																				
S45-28-1	0-28	A1	0.05	0.02	0.03	0.01	0.11	3.50	3.61	3	0.79	0.15	4.4	4.1	4.2	---	---	---	---	---
-2	28-43	A2	0.06	0.04	0.03	0.01	0.14	4.22	4.36	3	0.66	0.04	4.7	4.5	4.6	0.43	0.00	0.07	0.08	0.06
-3	43-86	A3	0.03	0.01	0.02	0.01	0.07	4.78	4.85	1	0.61	0.04	5.0	4.8	4.7	---	---	---	---	---
-4	86-109	Bh1	0.04	0.02	0.03	0.00	0.09	5.38	5.47	2	0.61	0.06	4.9	4.7	4.8	1.19	0.00	0.14	0.14	0.08
-5	109-170	Bh2	0.03	0.02	0.03	0.00	0.08	26.26	26.34	0	2.68	0.03	4.8	4.7	4.5	2.51	0.00	0.60	0.10	0.40
-6	170-203	Bh3	0.04	0.02	0.03	0.01	0.10	36.06	36.16	0	3.10	0.03	4.6	4.8	4.2	2.80	0.00	0.95	0.08	0.68
Kureb fine sand:																				
S45-19-1	0-13	A	0.30	0.12	0.08	0.02	0.52	11.60	12.12	4	1.22	3.84	4.0	3.4	3.3	---	---	---	---	---
-2	13-48	E	0.09	0.04	0.06	0.01	0.20	8.87	9.07	2	0.25	0.44	4.2	3.8	3.7	---	---	---	---	---
-3	48-76	C/Bh	0.12	0.03	0.09	0.01	0.25	16.04	16.29	2	0.83	0.07	4.3	4.2	4.2	---	---	---	---	---
-4	76-107	C1	0.11	0.04	0.07	0.01	0.23	10.45	10.68	2	0.42	0.04	4.8	4.7	4.7	---	---	---	---	---
-5	107-140	C2	0.05	0.01	0.06	0.00	0.12	7.75	7.87	2	0.21	0.04	4.7	4.7	4.9	---	---	---	---	---
-6	140-152	C3	0.06	0.03	0.05	0.00	0.14	6.52	6.66	2	0.15	0.03	4.8	4.7	4.8	---	---	---	---	---
-7	152-165	C4	0.04	0.01	0.04	0.00	0.09	6.20	6.29	1	0.09	0.05	4.9	5.0	5.0	---	---	---	---	---
-8	165-203	C5	0.02	0.01	0.04	0.00	0.07	6.36	6.43	1	0.11	0.03	5.0	5.1	5.0	---	---	---	---	---
Leefield fine sand:																				
S45-29-1	0-13	A	0.24	0.26	0.07	0.05	0.62	4.72	5.34	12	1.10	0.22	5.0	4.3	4.2	---	---	---	---	---
-2	13-36	E1	0.05	0.04	0.05	0.02	0.16	1.37	1.53	10	0.18	0.12	5.3	4.7	4.8	---	---	---	---	---
-3	36-58	E2	0.06	0.03	0.05	0.01	0.15	1.22	1.37	11	0.08	0.09	4.9	4.8	4.8	---	---	---	---	---
-4	58-74	E/B	0.34	0.18	0.05	0.04	0.61	1.70	2.31	26	0.05	0.13	5.1	4.8	4.8	---	---	---	---	---
-5	74-84	Btv	0.90	0.74	0.09	0.08	1.81	2.66	4.47	40	0.07	0.16	5.2	4.8	4.9	---	---	---	1.00	0.18
-6	84-112	Btg1	0.35	0.90	0.11	0.03	1.39	8.04	8.43	16	0.14	0.16	4.8	4.3	4.4	---	---	---	1.44	0.22
-7	112-203	Btg2	0.22	0.74	0.12	0.06	1.14	6.70	7.84	15	0.09	0.14	4.9	4.3	4.4	---	---	---	0.30	0.10
Leon fine sand:																				
S45-27-1	0-18	A	0.19	0.13	0.08	0.05	0.45	5.21	5.66	8	0.99	0.35	3.5	3.0	2.9	---	---	---	---	---
-2	18-46	E	0.07	0.04	0.03	0.01	0.15	0.17	0.32	47	0.14	3.40	3.2	3.5	4.0	---	---	---	---	---
-3	46-53	Bh1	0.08	0.06	0.07	0.02	0.23	22.27	22.50	1	2.46	1.70	3.1	3.8	4.0	2.18	0.01	0.23	0.00	0.16
-4	53-79	Bh2	0.04	0.04	0.04	0.00	0.12	10.48	10.60	1	1.00	1.40	3.8	4.4	4.4	---	---	---	---	---
-5	79-94	E'	0.04	0.03	0.04	0.00	0.11	1.56	1.67	7	0.18	0.37	4.3	4.5	4.6	---	---	---	---	---
-6	94-112	B'h1	0.08	0.03	0.03	0.00	0.14	8.51	8.65	2	0.75	0.21	4.5	4.5	4.7	0.77	0.04	0.31	0.02	0.18
-7	112-203	B'h2	0.02	0.01	0.03	0.00	0.06	9.45	9.51	1	1.00	0.14	4.5	4.6	4.6	1.39	0.01	0.18	0.00	0.10

TABLE 16.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases					Extractable acidity	Sum of cations	Base saturation	Organic carbon	Electrical conductivity	pH			Pyrophosphate extractable			Citrate-dithionite extractable	
			Ca	Mg	Na	K	Sum						H_2O (1:1)	$CaCl_2$ 0.1m (1:2)	KCl in (1:1)	C	Fe	Al	Fe	Al
	Cm		----Milliequivalents/100 grams of soil-----							Pct	Pct	Mmhos/cm				Pct	Pct	Pct	Pct	Pct
Leon fine sand, tidal:																				
S45-9-1	0-20	A1	1.22	2.80	8.31	0.46	12.79	0.00	12.79	100	0.58	7.69	5.9	5.8	6.5	---	---	---	---	---
-2	20-66	A2	1.95	3.29	16.40	0.66	22.30	0.28	22.58	99	0.76	11.53	5.8	5.7	6.1	---	---	---	---	---
-3	66-91	Bh1	2.55	3.70	17.53	0.76	24.54	2.05	26.59	92	1.06	13.00	5.9	5.9	6.2	0.19	0.03	0.13	0.10	0.10
-4	91-102	Bh2	1.65	3.45	13.40	0.67	19.17	1.96	21.13	91	0.58	9.31	6.0	6.0	6.6	0.02	0.03	0.06	0.21	0.10
-5	102-109	E	1.12	3.27	13.85	0.49	18.73	0.66	19.39	97	0.24	10.43	6.1	6.0	6.4	---	---	---	---	---
-6	109-150	B'h	1.02	2.67	7.53	0.58	11.80	1.40	13.20	89	0.31	3.72	6.1	6.1	6.5	0.00	0.01	0.01	0.07	0.04
-7	150-203	C	0.93	1.52	2.52	0.24	5.22	1.68	6.90	76	0.28	2.03	5.8	5.7	5.9	---	---	---	---	---
Mandarin fine sand:																				
S45-10-1	0-15	A	0.45	0.18	0.05	0.02	0.70	4.82	5.52	13	1.10	0.06	4.3	3.6	3.5	---	---	---	---	---
-2	15-30	E1	0.10	0.04	0.02	0.00	0.16	1.11	1.27	13	0.20	0.02	4.5	3.7	3.8	---	---	---	---	---
-3	30-51	E2	0.06	0.04	0.02	0.00	0.12	0.77	0.89	13	0.11	0.01	4.6	4.0	3.9	---	---	---	---	---
-4	51-56	Bh1	0.11	0.06	0.04	0.01	0.22	27.04	27.26	1	2.46	0.02	3.9	3.6	3.8	1.71	0.01	0.32	0.10	0.27
-5	56-64	Bh2	0.05	0.03	0.02	0.00	0.10	19.72	19.82	1	1.72	0.03	4.1	4.2	4.4	1.17	0.01	0.39	0.06	0.38
-6	64-79	Bh3	0.02	0.01	0.02	0.00	0.05	9.44	9.49	1	0.72	0.01	4.2	4.4	4.6	0.55	0.01	0.22	0.09	0.21
-7	79-150	BC	0.02	0.01	0.01	0.00	0.04	1.61	1.65	2	0.12	0.01	4.2	4.6	4.8	---	---	---	---	---
-8	150-203	C	0.01	0.01	0.02	0.00	0.04	0.22	0.26	15	0.07	0.02	4.6	4.9	4.9	---	---	---	---	---
Meadowbrook fine sand:																				
S45-25-1	0-20	A	0.09	0.07	0.07	0.02	0.25	11.04	11.29	2	2.16	0.07	4.0	3.4	3.3	---	---	---	---	---
-2	20-36	E1	0.03	0.02	0.03	0.00	0.08	5.07	5.15	1	0.53	0.03	4.4	3.7	3.6	---	---	---	---	---
-3	36-76	E2	0.06	0.13	0.03	0.00	0.22	2.78	3.00	7	0.48	0.02	4.9	4.0	3.8	---	---	---	---	---
-4	76-112	E3	0.04	0.06	0.02	0.00	0.12	0.98	1.10	7	0.05	0.10	5.2	4.5	4.3	---	---	---	---	---
-5	112-155	Btg1	2.67	5.76	0.16	0.20	8.79	12.84	21.63	41	0.11	0.02	4.5	3.4	3.0	---	---	---	2.06	0.14
-6	155-203	Btg2	3.30	7.41	0.17	0.29	11.17	14.10	25.27	44	0.09	0.02	4.5	3.5	2.9	---	---	---	0.92	0.12
Meggett loamy fine sand:																				
S45-18-1	0-15	A1	0.14	0.09	0.15	0.02	0.40	9.17	9.57	4	1.21	0.00	4.4	3.8	3.5	---	---	---	---	---
-2	15-30	A2	0.05	0.04	0.09	0.00	0.18	4.34	4.52	4	0.36	0.00	4.7	4.1	4.1	---	---	---	---	---
-3	30-41	E	0.07	0.11	0.10	0.00	0.28	2.47	2.75	10	0.22	0.00	5.4	4.1	4.0	---	---	---	---	---
-4	41-71	Btg1	1.17	2.39	0.36	0.07	3.99	12.65	16.64	24	0.24	0.03	4.9	3.9	3.6	---	---	---	1.22	0.17
-5	71-119	Btg2	2.90	6.58	0.60	0.19	10.27	19.60	29.87	34	0.27	0.03	4.9	3.9	3.5	---	---	---	3.46	0.33
-6	119-173	Btg3	5.20	8.64	0.63	0.19	14.66	14.02	28.68	51	0.02	0.00	5.0	3.8	3.3	---	---	---	0.73	0.11
-7	173-203	Btg4	7.80	11.93	0.68	0.17	20.58	11.83	32.41	63	0.05	0.00	5.2	3.7	3.2	---	---	---	0.20	0.06

TABLE 16.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases					Extractable acidity	Sum of cations	Base saturation	Organic carbon	Electrical conductivity	pH			Pyrophosphate extractable			Citrate-dithionite extractable	
			Ca	Mg	Na	K	Sum						H_2O (1:1)	$CaCl_2$ 0.1m (1:2)	KCl in (1:1)	C	Fe	Al	Fe	Al
	Cm		----Milliequivalents/100 grams of soil-----							Pct	Pct	Mmhos/cm				Pct	Pct	Pct	Pct	Pct
Newhan fine sand:																				
S45-2-1	0-20	A	0.58	0.08	0.02	0.00	0.68	0.00	0.68	100	0.10	0.05	6.9	6.6	6.4	---	---	---	---	---
-2	20-76	C	0.59	0.08	0.02	0.00	0.69	0.00	0.69	100	0.08	0.04	6.9	6.7	6.4	---	---	---	---	---
-3	76-140	C	1.82	0.07	0.03	0.00	1.92	0.00	1.92	100	0.08	0.06	7.3	7.2	8.2	---	---	---	---	---
-4	140-203	C	1.97	0.07	0.04	0.00	2.08	0.00	2.08	100	0.08	0.07	7.3	7.2	7.3	---	---	---	---	---
Ocilla fine sand:																				
S45-23-1	0-18	Ap	0.28	0.06	0.04	0.02	0.40	4.51	4.91	8	0.79	0.04	4.8	4.2	3.8	---	---	---	---	---
-2	18-51	E1	0.04	0.01	0.02	0.01	0.08	2.41	2.49	3	0.21	0.02	5.1	4.3	4.5	---	---	---	---	---
-3	51-86	E2	0.06	0.04	0.02	0.01	0.13	1.38	1.51	9	0.10	0.03	5.0	4.3	4.6	---	---	---	---	---
-4	86-94	BE	0.08	0.04	0.03	0.02	0.17	3.41	3.58	5	0.16	0.03	4.6	3.9	4.2	---	---	---	1.88	0.32
-5	94-119	Btg1	0.12	0.33	0.04	0.04	0.53	9.10	9.63	6	0.13	0.03	4.6	3.7	3.9	---	---	---	0.48	0.16
-6	119-145	Btg2	0.25	0.45	0.05	0.05	0.80	9.76	10.56	1	0.09	0.02	4.7	3.8	4.0	---	---	---	1.12	0.22
-7	145-203	Btg3	0.21	0.33	0.04	0.05	0.63	7.79	8.42	7	0.10	0.03	4.7	3.9	3.9	---	---	---	0.86	0.20
Ortega fine sand:																				
S45-5-1	0-15	A	0.31	0.10	0.04	0.02	0.47	6.22	6.69	7	1.54	0.03	5.2	4.0	4.0	---	---	---	---	---
-2	15-38	C1	0.04	0.02	0.02	0.00	0.08	2.59	2.67	3	0.45	0.00	5.1	4.6	4.7	---	---	---	---	---
-3	38-58	C2	0.03	0.01	0.02	0.00	0.06	1.31	1.37	4	0.23	0.00	5.1	4.7	4.8	---	---	---	---	---
-4	58-71	C3	0.04	0.04	0.08	0.01	0.17	0.56	0.73	23	0.17	0.01	4.8	4.5	4.8	---	---	---	---	---
-5	71-104	C4	0.03	0.02	0.01	0.00	0.06	1.49	1.55	4	0.08	0.02	4.9	4.5	4.8	---	---	---	---	---
-6	104-155	C5	0.02	0.03	0.01	0.00	0.06	1.05	1.11	5	0.05	0.00	5.0	4.6	4.8	---	---	---	---	---
-7	155-203	C6	0.04	0.03	0.01	0.00	0.08	0.40	0.48	17	0.02	0.00	5.2	4.8	4.9	---	---	---	---	---
Osier loamy fine sand:																				
S45-31-1	0-13	A1	0.16	0.12	0.09	0.06	0.43	9.94	10.37	4	2.70	0.36	4.0	3.7	3.7	---	---	---	---	---
-2	13-36	A2	0.04	0.03	0.06	0.01	0.14	5.73	5.87	2	0.83	0.18	4.3	4.3	4.4	---	---	---	---	---
-3	36-79	Cg1	0.01	0.03	0.05	0.00	0.09	3.85	3.94	2	0.37	0.12	4.5	4.5	4.7	---	---	---	---	---
-4	79-96	Cg2	0.08	0.05	0.05	0.00	0.18	1.78	1.96	9	0.19	0.23	4.9	4.6	4.8	---	---	---	---	---
-5	96-109	Cg3	0.05	0.02	0.03	0.00	0.10	1.21	1.31	8	0.11	0.21	4.3	4.6	4.8	---	---	---	---	---
-6	109-117	Cg4	0.42	0.14	0.08	0.01	0.65	3.14	3.79	17	0.18	0.19	5.0	4.3	4.4	---	---	---	---	---
-7	117-127	Cg5	1.95	0.70	0.09	0.03	2.77	5.43	8.20	34	0.11	0.15	4.6	4.2	4.2	---	---	---	---	---
-8	127-203	Cg6	0.49	0.18	0.06	0.01	0.74	1.45	2.19	34	0.05	0.13	5.5	4.5	4.4	---	---	---	---	---

TABLE 16.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	Extractable bases: Mg	Extractable bases: Na	Extractable bases: K	Extractable bases: Sum	Extractable acidity	Sum of cations	Base saturation	Organic carbon	Electrical conductivity	pH: H_2O (1:1)	pH: $CaCl_2$ 0.1m (1:2)	pH: KCl in (1:1)	Pyrophosphate extractable: C	Pyrophosphate extractable: Fe	Pyrophosphate extractable: Al	Citrate-dithionite extractable: Fe	Citrate-dithionite extractable: Al
	Cm		----Milliequivalents/100 grams of soil-----							Pct	Pct	Mmhos/cm				Pct	Pct	Pct	Pct	Pct
Penney fine sand:																				
S45-30-1	0-13	A	0.70	0.11	0.04	0.04	0.89	5.72	6.61	13	1.21	0.28	4.5	4.5	4.4	---	---	---	---	---
-2	13-38	E1	0.10	0.04	0.04	0.01	0.19	2.75	2.94	6	0.35	0.11	5.1	4.9	4.8	---	---	---	---	---
-3	38-76	E2	0.12	0.08	0.04	0.01	0.25	1.19	1.44	17	0.14	0.12	5.1	4.9	4.9	---	---	---	---	---
-4	76-104	E3	0.04	0.03	0.04	0.00	0.11	0.66	0.77	14	0.03	0.10	5.0	4.9	4.9	---	---	---	---	---
-5	104-137	E/B	0.04	0.02	0.03	0.00	0.09	0.44	0.53	17	0.04	0.09	5.0	4.9	4.9	---	---	---	---	---
-6	137-203	EB	0.11	0.10	0.03	0.00	0.24	0.50	0.74	32	0.07	0.08	5.1	4.9	4.9	---	---	---	---	---
Resota fine sand:																				
S45-3-1	0-10	A	0.48	0.17	0.04	0.03	0.72	0.86	1.58	46	1.84	0.08	4.4	3.8	3.5	---	---	---	---	---
-2	10-18	E1	0.04	0.03	0.02	0.00	0.09	0.90	0.99	9	0.24	0.05	4.5	4.1	3.8	---	---	---	---	---
-3	18-58	E2	0.04	0.02	0.02	0.00	0.08	0.53	0.61	13	0.12	0.04	4.6	4.4	4.0	---	---	---	---	---
-4	58-68	E3	0.02	0.02	0.01	0.00	0.05	0.89	0.94	5	0.13	0.04	4.6	4.3	4.0	---	---	---	---	---
-5	68-79	Bw1	0.05	0.04	0.03	0.01	0.13	3.80	3.93	3	0.51	0.07	4.5	4.4	4.2	---	---	---	---	---
-6	79-127	Bw2	0.01	0.01	0.02	0.00	0.04	2.85	2.89	1	0.48	0.05	4.7	4.8	4.7	---	---	---	---	---
-7	127-203	Bw3	0.02	0.01	0.03	0.00	0.06	0.45	0.51	12	0.11	0.08	4.6	4.9	4.8	---	---	---	---	---
Ridgewood fine sand:																				
S45-4-1	0-18	Ap	0.37	0.19	0.45	0.03	1.04	3.53	4.57	23	0.80	0.08	4.8	4.8	4.3	---	---	---	---	---
-2	18-61	Bw	0.28	0.29	1.15	0.05	1.77	1.67	3.44	51	0.36	0.39	5.0	5.0	4.7	---	---	---	---	---
-3	61-74	C1	0.08	0.06	0.03	0.01	0.18	1.06	1.24	15	0.19	0.19	5.1	5.0	4.7	---	---	---	---	---
-4	74-89	C2	0.04	0.04	0.02	0.00	0.10	0.36	0.46	22	0.09	0.09	5.5	4.7	4.7	---	---	---	---	---
-5	89-117	C3	0.03	0.02	0.01	0.00	0.06	0.00	0.06	100	0.04	0.04	5.0	4.8	4.7	---	---	---	---	---
-6	117-203	C4	0.02	0.01	0.01	0.00	0.04	0.00	0.04	100	0.05	0.05	6.8	6.3	4.9	---	---	---	---	---
Sapelo fine sand:																				
S45-21-1	0-15	A	3.92	1.11	0.13	0.30	5.46	20.51	25.97	21	5.34	0.10	3.9	3.6	3.3	---	---	---	---	---
-2	15-25	E1	0.25	0.11	0.06	0.04	0.46	4.37	4.83	10	0.65	0.04	4.1	3.6	3.5	---	---	---	---	---
-3	25-53	E2	0.07	0.03	0.04	0.01	0.15	1.73	1.88	8	0.21	0.02	4.5	4.1	3.9	---	---	---	---	---
-4	53-68	Bh	0.04	0.04	0.09	0.00	0.17	34.02	34.19	1	4.20	0.01	4.0	3.8	3.1	1.90	0.02	0.30	0.08	0.19
-5	68-109	E'	0.03	0.01	0.06	0.01	0.11	9.87	9.98	1	0.72	0.07	4.4	4.2	4.4	---	---	---	---	---
-6	109-137	Btg1	0.06	0.08	0.09	0.03	0.26	13.44	13.70	2	0.60	0.03	4.3	4.0	4.5	---	---	---	0.56	0.32
-7	137-175	Btg2	0.08	0.37	0.09	0.05	0.59	11.35	11.94	5	0.35	0.02	4.4	4.0	4.4	---	---	---	1.04	0.28
-8	175-203	C	0.09	0.37	0.07	0.03	0.56	5.26	5.82	10	0.13	0.02	4.5	4.3	4.4	---	---	---	---	---

TABLE 17.--CLAY MINERALOGY OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Clay minerals			
			Montmo-rillonite	14-angstrom intergrade	Kaolinite	Quartz
	Cm		Pct	Pct	Pct	Pct
Albany fine sand:						
S45-7-1	0-5	A	16	38	29	17
-3	13-43	E2	0	41	45	14
-6	127-142	BE	0	23	67	10
-8	157-203	Btg2	22	23	46	9
Boulogne fine sand:						
S45-15-1	0-18	Ap	0	39	12	49
-3	25-33	Bh	0	38	9	53
-8	102-137	B'h2	26	16	6	52
Buccaneer clay:						
S45-17-1	0-13	A	94	0	4	2
-3	51-81	Btg2	95	0	3	2
-6	185-203	Cg	94	0	4	2
Centenary fine sand:						
S45-8-1	0-8	A1	0	61	13	26
-3	18-66	E1	16	54	12	18
-7	152-178	Bh1	18	37	12	33
Chaires fine sand:						
S45-16-1	0-18	A	19	20	17	44
-4	58-74	Bh1	13	49	26	12
-7	96-140	Btg1	48	24	23	5
-9	165-203	Btg3	85	0	12	3
Chaires fine sand:						
S45-22-1	0-18	A	0	11	23	66
-4	56-68	Bh2	0	24	22	54
-7	91-127	Btg2	0	14	70	16
-9	165-203	Btg4	62	0	30	8
Corolla fine sand:						
S45-20-1	0-15	A	35	11	11	43
-4	51-66	C3	54	3	7	36
-6	104-203	C5	31	7	10	52
Echaw fine sand:						
S45-13-1	0-15	A	33	25	10	32
-4	89-96	Bh	17	53	10	20
-8	183-206	E'4	0	40	10	50
Evergreen muck:						
S45-14-3	28-36	A1	0	62	12	26
-6	66-140	Bh1	0	53	15	32
Fripp fine sand:						
S45-1-1	0-10	A	78	0	10	12
-4	140-203	C	83	0	8	9
Goldhead fine sand:						
S45-24-1	0-20	A	24	19	24	33
-4	84-168	Btg	81	0	13	6
-5	168-203	C	57	11	24	8
Goldhead fine sand:						
S45-26-1	0-15	A	16	27	41	16
-4	84-135	Btg1	33	18	38	11
-5	135-203	Btg2	41	17	30	12

TABLE 17.--CLAY MINERALOGY OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Clay minerals			
			Montmorillonite	14-angstrom intergrade	Kaolinite	Quartz
	Cm		Pct	Pct	Pct	Pct
Hurricane fine sand:						
S45-11-1	0-13	Ap	0	63	15	22
-3	25-58	E2	0	64	14	22
-7	196-203	Bh2	0	41	13	46
Kershaw fine sand:						
S45-6-1	0-18	A	0	58	16	26
-4	147-203	C3	26	47	15	12
Kingsferry fine sand:						
S45-28-1	0-28	A1	0	27	7	66
-4	86-109	Bh1	0	33	9	58
-6	170-203	Bh3	0	12	13	75
Kureb fine sand:						
S45-19-1	0-13	A	0	52	10	38
-4	76-107	C1	19	26	7	48
-8	165-203	C5	0	13	5	82
Leefield fine sand:						
S45-29-1	0-13	A	0	43	43	14
-5	74-107	Btv	7	34	46	13
-7	112-203	Btg2	7	11	68	14
Leon fine sand:						
S45-27-1	0-18	A	0	0	0	100
-3	46-53	Bh1	0	32	10	58
-7	112-203	B'h2	0	10	7	83
Leon fine sand, tidal:						
S45-9-1	0-20	A1	54	18	18	10
-3	66-91	Bh1	25	33	13	29
-7	150-203	C	45	0	46	9
Mandarin fine sand:						
S45-10-1	0-15	A	23	14	15	48
-4	51-56	Bh1	18	24	10	48
-8	150-203	C	19	31	8	42
Meadowbrook fine sand:						
S45-25-1	0-20	A	28	18	20	34
-5	112-155	Btg1	70	0	20	10
-6	155-203	Btg2	70	0	20	10
Meggett loamy fine sand:						
S45-18-1	0-15	A1	31	28	34	7
-4	41-71	Btg1	32	27	34	7
-7	173-203	Btg4	93	0	5	2
Newhan fine sand:						
S45-2-1	0-20	A	73	0	12	15
-4	140-203	C	66	0	24	10
Ocilla fine sand:						
S45-23-1	0-18	Ap	13	40	31	16
-5	94-119	Btg1	0	18	69	13
-7	145-203	Btg3	0	12	74	14

TABLE 17.--CLAY MINERALOGY OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Clay minerals			
			Montmorillonite	14-angstrom intergrade	Kaolinite	Quartz
	Cm		Pct	Pct	Pct	Pct
Ortega fine sand:						
S45-5-1	0-15	A	0	61	18	21
-3	38-58	C2	0	68	17	15
-7	155-203	C6	22	50	13	15
Osier loamy fine sand:						
S45-31-1	0-13	A1	26	29	33	12
-4	79-96	Cg2	34	31	22	13
-8	127-203	Cg6	56	14	20	10
Penney fine sand:						
S45-30-1	0-13	A	10	38	29	23
-4	76-104	E3	10	39	36	15
-6	137-203	EB	0	41	47	12
Resota fine sand:						
S45-3-1	0-10	A	57	18	8	17
-5	68-79	Bw1	50	31	8	11
-7	127-203	Bw3	15	36	10	39
Ridgewood fine sand:						
S45-4-1	0-18	Ap	14	54	15	17
-3	61-74	C1	0	66	19	15
-6	117-203	C4	17	52	15	16
Sapelo fine sand:						
S45-21-1	0-15	A	0	11	14	75
-4	53-68	Bh	0	25	45	30
-6	109-137	Btg1	0	20	66	14
-8	175-203	C	15	18	55	12

TABLE 18.--ENGINEERING INDEX TEST DATA

[Tests performed by the Florida Department of Transportation (FDOT) in cooperation with the U.S. Bureau of Public Roads, in accordance with standard procedures of the American Association of State Highway and Transportation Officials (AASHTO). See the section "Soil Series and Their Morphology" for the location of the pedon sampled. NP means nonplastic]

Soil name, report number, horizon, and depth in inches	FDOT report number	Classification		Mechanical analysis								Liquid limit	Plasticity index	Moisture density	
				Percentage passing sieve--				Percentage smaller than--							
		AASHTO	Unified	No. 4	No. 10	No. 40	No. 200	.05 mm	.02 mm	.005 mm	.002 mm			Maximum dry density	Optimum moisture
												Pct		Lb/ft^3	Pct
Albany fine sand: (S84FL-089-007)															
E2-------- 5-17	7	A-2-4	SP-SM	100	100	100	15	11	6	3	2	NP	NP	106	14
Btg2------ 62-80	8	A-2-4	SM	100	100	100	20	19	16	15	15	NP	NP	108	17
Boulogne fine sand: (S85FL-089-015)															
B'h2------ 40-54	17	A-3	SP-SM	100	100	100	8	6	6	2	0	NP	NP	105	14
Buccaneer clay: (S85FL-089-017)															
Btg1------ 5-18	21	A-7-6	CH	100	100	100	77	72	64	54	49	60	41	91	28
Btg4------ 48-65	22	A-7-6	CH	100	100	100	76	65	50	45	42	48	29	90	24
Centenary fine sand: (S84FL-089-008)															
E1-------- 7-26	9	A-3	SP	100	100	100	4	3	2	0	0	NP	NP	101	16
Chaires fine sand: (S85FL-089-016)															
E--------- 7-18	18	A-3	SP	100	100	99	9	6	3	0	0	NP	NP	100	15
Bh1------- 23-29	19	A-2-4	SM	100	100	99	18	15	11	5	4	NP	NP	108	13
Btg1------ 38-56	20	A-7-6	SC	100	100	99	48	46	41	37	36	46	25	105	18
Chaires fine sand: (S85FL-089-022)															
E--------- 7-14	29	A-3	SP	100	100	94	7	7	5	0	0	NP	NP	100	16
Btg2------ 36-50	30	A-6	SC	100	100	99	36	36	34	31	21	34	17	105	20
Corolla fine sand: (S85FL-089-020)															
A--------- 0-6	25	A-3	SP	100	100	98	1	0	0	0	0	NP	NP	98	16
C5-------- 41-80	26	A-3	SW	100	100	47	1	0	0	0	0	NP	NP	107	14
Echaw fine sand: (S84FL-089-013)															
E'2------- 43-54	15	A-3	SP	100	100	100	2	0	0	0	0	NP	NP	97	17
Evergreen muck: (S85FL-089-014)															
E--------- 17-26	16	A-2-4	SM	100	100	100	12	11	10	6	5	NP	NP	107	14

TABLE 18.--ENGINEERING INDEX TEST DATA--Continued

Soil name, report number, horizon, and depth in inches	FDOT report number	Classification		Mechanical analysis: Percentage passing sieve--				Mechanical analysis: Percentage smaller than--				Liquid limit	Plasticity index	Moisture density	
		AASHTO	Unified	No. 4	No. 10	No. 40	No. 200	.05 mm	.02 mm	.005 mm	.002 mm			Maximum dry density	Optimum moisture
												Pct		Lb/ft^3	Pct
Fripp fine sand: (S84FL-089-001)															
C--------- 4-80	1	A-3	SP	100	100	100	1	0	0	0	0	NP	NP	96	16
Goldhead fine sand: (S85FL-089-024)															
E2-------- 16-33	35	A-2-4	SM	100	100	100	15	13	8	4	3	NP	NP	102	14
Btg------- 33-69	36	A-6	SC	100	100	99	43	41	36	32	31	32	13	106	18
Goldhead fine sand: (S85FL-089-026)															
E2-------- 12-33	37	A-2-4	SM	100	100	98	15	14	10	6	6	NP	NP	106	14
Btg1------ 33-54	38	A-2-6	SC	100	100	100	32	30	29	26	25	29	13	110	16
Hurricane fine sand: (S84FL-089-011)															
E2-------- 10-20	12	A-3	SP	100	100	100	4	4	4	0	0	NP	NP	100	16
Kershaw fine sand: (S84FL-089-006)															
C2-------- 30-58	6	A-3	SP-SM	100	100	99	5	4	3	3	2	NP	NP	101	15
Kingsferry fine sand: (S85FL-089-028)															
A3-------- 17-34	40	A-3	SP-SM	100	100	100	9	9	9	4	2	NP	NP	106	14
Kureb fine sand: (S85FL-089-019)															
E--------- 5-19	24	A-3	SP	100	100	99	3	0	0	0	0	NP	NP	96	17
Leefield fine sand: (S86FL-089-029)															
E1-------- 5-14	41	A-2-4	SM	100	100	100	15	9	7	4	3	NP	NP	104	10
Btg2------ 44-80	42	A-7-6	SC	100	100	100	48	40	34	32	32	49	39	108	17
Leon fine sand: (S85FL-089-027)															
E--------- 7-18	39	A-3	SP	100	100	100	6	5	3	1	0	NP	NP	99	12
Mandarin fine sand: (S84FL-089-010)															
E2-------- 12-20	11	A-3	SP	100	100	100	3	3	1	0	0	NP	NP	95	16

TABLE 18.--ENGINEERING INDEX TEST DATA--Continued

Soil name, report number, horizon, and depth in inches	FDOT report number	Classification		Mechanical analysis								Liquid limit	Plasticity index	Moisture density	
				Percentage passing sieve--				Percentage smaller than--							
		AASHTO	Unified	No. 4	No. 10	No. 40	No. 200	.05 mm	.02 mm	.005 mm	.002 mm			Maximum dry density	Optimum moisture
												Pct		Lb/ft^3	Pct
Meadowbrook fine sand: (S85FL-089-025)															
E1-------- 8-14	33	A-2-4	SP-SM	100	100	100	18	14	8	3	3	NP	NP	100	16
Btg1------ 44-61	34	A-6	SC	100	100	100	39	36	32	29	27	30	14	108	18
Meggett loamy fine sand: (S85FL-089-018)															
Btg2------ 28-47	23	A-7-5	CH	100	100	100	62	59	54	48	46	56	24	97	21
Newhan fine sand: (S84FL-089-002)															
C--------- 8-80	2	A-3	SP	100	100	99	1	0	0	0	0	NP	NP	99	16
Ocilla fine sand: (S85FL-089-023)															
E1-------- 7-20	31	A-3	SM	100	100	96	10	9	7	4	5	NP	NP	106	12
Btg1------ 37-47	32	A-2-4	SC	100	100	97	29	28	28	25	24	31	10	109	18
Ortega fine sand: (S84FL-089-005)															
C1-------- 6-15	5	A-3	SP	100	100	100	6	5	2	0	0	NP	NP	100	14
Osier loamy fine sand: (S86FL-089-031)															
Cg1------- 14-31	45	A-2-4	SP	100	100	100	11	10	8	5	5	NP	NP	101	10
Penney fine sand: (S85FL-089-030)															
E1-------- 5-15	43	A-2-4	SP	100	100	99	11	7	5	3	2	NP	NP	102	9
EB-------- 54-80	44	A-2-4	SP-SM	100	100	99	14	12	8	6	6	NP	NP	103	10
Resota fine sand: (S84FL-089-003)															
E2-------- 7-23	3	A-3	SP	100	100	100	3	2	1	0	0	NP	NP	94	14
Ridgewood fine sand: (S84FL-089-004)															
Bw-------- 7-24	4	A-3	SP	100	100	100	5	4	2	0	0	NP	NP	101	16
Sapelo fine sand: (S85FL-089-021)															
E2-------- 10-21	27	A-3	SP	100	100	98	6	5	3	0	0	NP	NP	95	13
Btg2------ 54-67	28	A-2-6	SC	100	100	99	29	29	23	23	22	35	20	108	17

TABLE 19.--CLASSIFICATION OF THE SOILS

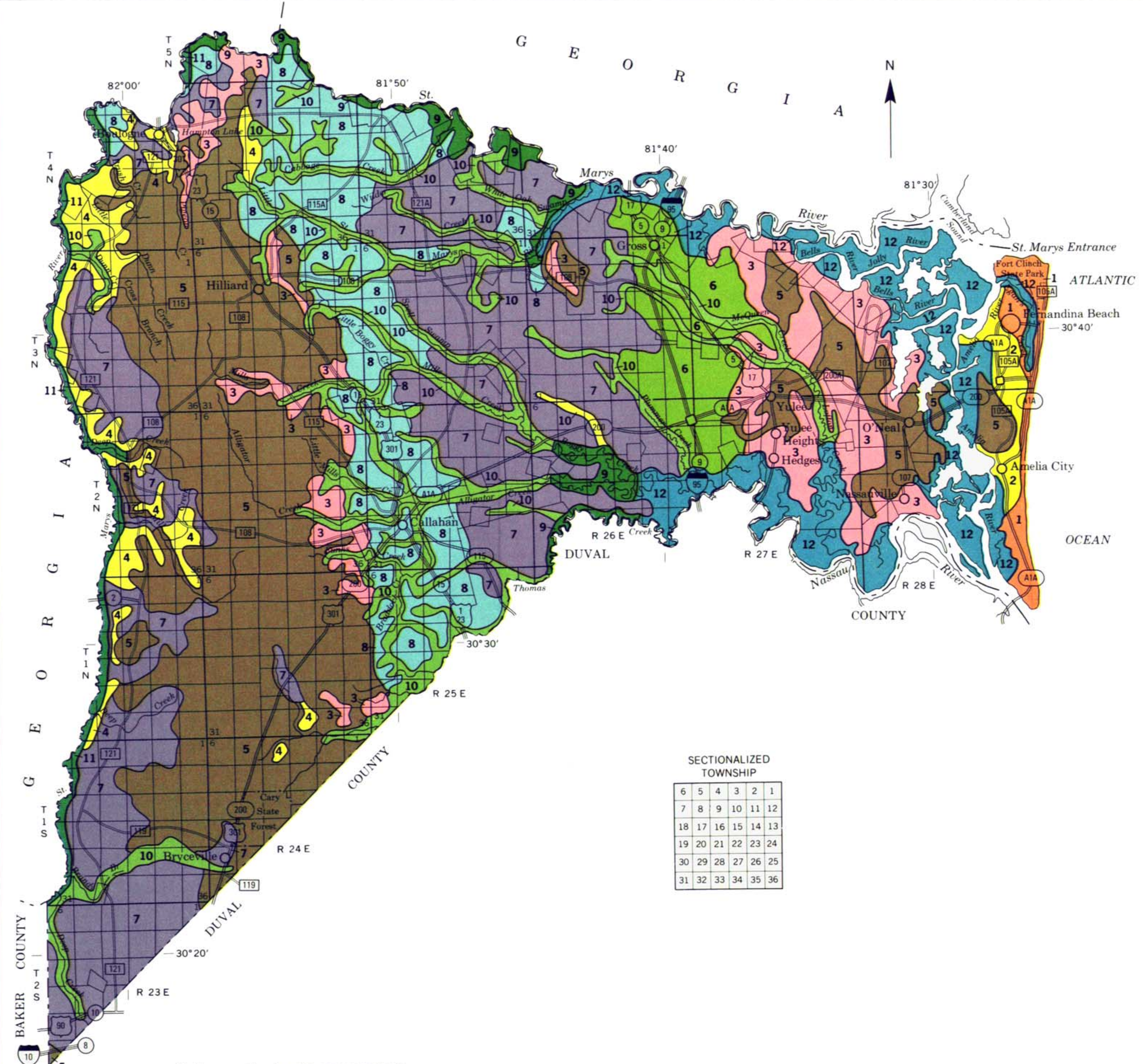
Soil name	Family or higher taxonomic class
Albany	Loamy, siliceous, thermic Grossarenic Paleudults
Aqualfs	Aqualfs
Arents	Arents
Blanton	Loamy, siliceous, thermic Grossarenic Paleudults
Boulogne	Sandy, siliceous, thermic Typic Haplaquods
Brookman	Fine, mixed, thermic Typic Umbraqualfs
Buccaneer	Fine, montmorillonitic, thermic Typic Argiaquolls
Centenary	Sandy, siliceous, thermic Grossarenic Entic Haplohumods
*Chaires	Sandy, siliceous, thermic Alfic Haplaquods
Corolla	Thermic, uncoated Aquic Quartzipsamments
Croatan	Loamy, siliceous, dysic, thermic Terric Medisaprists
*Echaw	Sandy, siliceous, thermic Entic Haplohumods
Ellabelle	Loamy, siliceous, thermic Arenic Umbric Paleaquults
Evergreen	Sandy, siliceous, thermic Typic Haplaquods
Fripp	Thermic, uncoated Typic Quartzipsamments
Goldhead	Loamy, siliceous, thermic Arenic Ochraqualfs
Hurricane	Sandy, siliceous, thermic Grossarenic Entic Haplohumods
Kershaw	Thermic, uncoated Typic Quartzipsamments
Kingsferry	Sandy, siliceous, thermic Arenic Haplaquods
Kingsland	Euic, thermic Typic Medihemists
Kureb	Thermic, uncoated Spodic Quartzipsamments
Leefield	Loamy, siliceous, thermic Arenic Plinthaquic Paleudults
Leon	Sandy, siliceous, thermic Aeric Haplaquods
Lynn Haven	Sandy, siliceous, thermic Typic Haplaquods
Mandarin	Sandy, siliceous, thermic Typic Haplohumods
Maurepas	Euic, thermic Typic Medisaprists
Meadowbrook	Loamy, siliceous, thermic Grossarenic Ochraqualfs
*Meggett	Fine, mixed, thermic Typic Albaqualfs
Newhan	Thermic, uncoated Typic Quartzipsamments
Ocilla	Loamy, siliceous, thermic Aquic Arenic Paleudults
Ortega	Thermic, uncoated Typic Quartzipsamments
Osier	Siliceous, thermic Typic Psammaquents
Ousley	Thermic, uncoated Aquic Quartzipsamments
Penney	Thermic, uncoated Typic Quartzipsamments
Pottsburg	Sandy, siliceous, thermic Grossarenic Haplaquods
Resota	Thermic, uncoated Spodic Quartzipsamments
Ridgewood	Thermic, uncoated Aquic Quartzipsamments
Rutlege	Sandy, siliceous, thermic Typic Humaquepts
Sapelo	Sandy, siliceous, thermic Ultic Haplaquods
Tisonia	Clayey, montmorillonitic, euic, thermic Terric Sulfihemists
Wesconnett	Sandy, siliceous, thermic Typic Haplaquods

* The soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

NRCS Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.


G E O R G I A
N
82°00'
81°50'
81°40'
81°30'
30°40'
30°30'
30°20'
T 5 N
T 4 N
T 3 N
T 2 N
T 1 N
T 1 S
T 2 S
R 23 E
R 24 E
R 25 E
R 26 E
R 27 E
R 28 E
St. Marys River
St. Marys Entrance
Cumberland Sound
ATLANTIC OCEAN
Fort Clinch State Park
Fernandina Beach
Amelia City
Amelia River
Bells River
Jolly River
Nassau River
Boulogne
Hampton Lake
Hilliard
Gross
Yulee
Yulee Heights
Hedges
O'Neal
Nassauville
Callahan
Bryceville
Cary State Forest
Thomas Creek
Alligator Creek
Little Boggy Creek
Mills Creek
Lofton Creek
Plummer Creek
Cabbage Creek
Wolf Creek
Mills Creek
DUVAL COUNTY
BAKER COUNTY

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

SOIL LEGEND

SOILS ON THE SAND RIDGES AND COASTAL DUNES

1 KUREB-FRIPP-NEWHAN: Nearly level to rolling, excessively drained, sandy soils; in high positions on the landscape

2 MANDARIN-ECHAW: Nearly level, somewhat poorly drained and moderately well drained soils; in high positions on the landscape

3 RIDGEWOOD-HURRICANE-POTTSBURG: Nearly level and gently sloping, somewhat poorly drained and poorly drained, sandy soils; in high positions on the landscape

4 ALBANY-BLANTON-PENNEY: Nearly level to moderately steep, somewhat poorly drained, moderately well drained, and excessively drained soils; in high positions on the landscape

SOILS ON THE FLATWOODS

5 LEON-BOULOGNE-KINGSFERRY: Nearly level, poorly drained and very poorly drained soils, that are sandy throughout; in low positions on the landscape

6 SAPELO-LEON-GOLDHEAD: Nearly level, poorly drained soils that are sandy in the upper part and loamy or sandy in the lower part; in low positions on the landscape

7 GOLDHEAD-CHAIRES-MEADOWBROOK: Nearly level and gently sloping, poorly drained and very poorly drained soils that are sandy in the upper part and loamy in the lower part; in low positions on the landscape

8 MEGGETT-GOLDHEAD: Nearly level and gently sloping, poorly drained and very poorly drained soils that are sandy in the upper part and clayey or loamy in the lower part; in low positions on the landscape

SOILS IN THE SWAMPS AND ON THE FLOOD PLAINS

9 KINGSLAND-MAUREPAS: Level and nearly level, very poorly drained, organic soils; in low positions on the landscape

10 BUCCANEER-ELLABELLE: Nearly level, very poorly drained soils; in low positions on the landscape

11 OSIER-OUSLEY-MANDARIN: Nearly level to gently sloping, poorly drained and somewhat poorly drained, sandy soils; in low positions on the landscape

SOILS IN THE TIDAL MARSH

12 TISONIA: Nearly level and gently sloping, very poorly drained, saline, organic soils; in low positions on the landscape

Compiled 1990

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
UNIVERSITY OF FLORIDA
INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES
AGRICULTURAL EXPERIMENT STATIONS
SOIL SCIENCE DEPARTMENT
FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

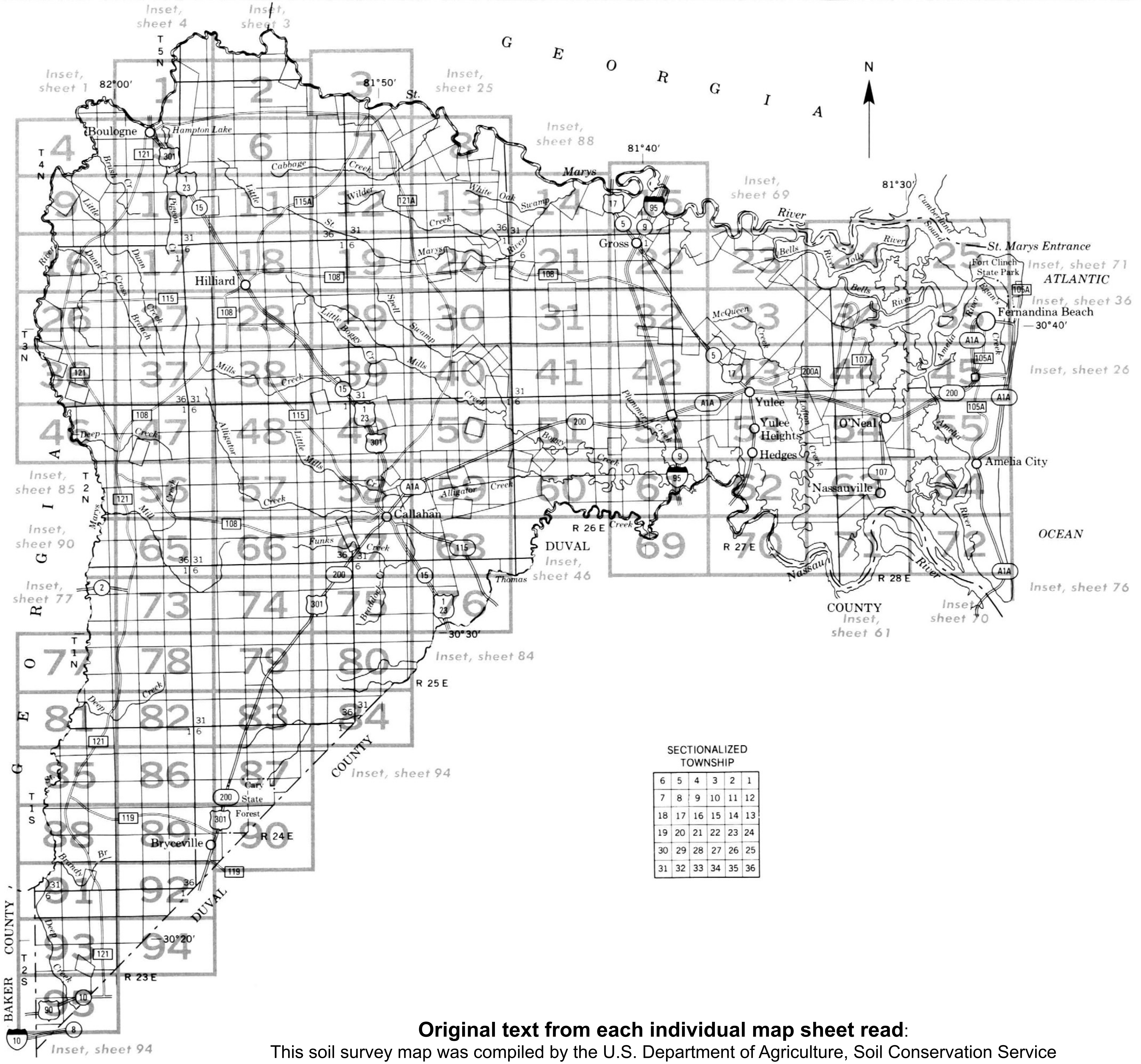
GENERAL SOIL MAP

NASSAU COUNTY, FLORIDA

Scale 1:253,440

1 0 1 2 3 4 Mi

1 0 4 8 Km


GEORGIA
N
ATLANTIC
OCEAN
DUVAL COUNTY
BAKER COUNTY
Inset, sheet 1
Inset, sheet 3
Inset, sheet 4
Inset, sheet 25
Inset, sheet 88
Inset, sheet 69
Inset, sheet 71
Inset, sheet 36
Inset, sheet 26
Inset, sheet 76
Inset, sheet 70
Inset, sheet 61
Inset, sheet 46
Inset, sheet 84
Inset, sheet 94
Inset, sheet 85
Inset, sheet 90
Inset, sheet 77
82°00′
81°50′
81°40′
81°30′
30°40′
30°30′
30°20′
T 5 N
T 4 N
T 3 N
T 2 N
T 1 N
T 1 S
T 2 S
R 23 E
R 24 E
R 25 E
R 26 E
R 27 E
R 28 E
Boulogne
Hilliard
Gross
Yulee
Yulee Heights
Hedges
O'Neal
Nassauville
Amelia City
Fernandina Beach
Fort Clinch State Park
St. Marys Entrance
Callahan
Bryceville
Cary State Forest
St. Marys River
Nassau River
Hampton Lake
SECTIONALIZED TOWNSHIP
6 5 4 3 2 1
7 8 9 10 11 12
18 17 16 15 14 13
19 20 21 22 23 24
30 29 28 27 26 25
31 32 33 34 35 36

INDEX TO MAP SHEETS
NASSAU COUNTY, FLORIDA

Scale 1:253,440
1 0 1 2 3 4 Mi
1 0 4 8 Km

Original text from each individual map sheet read:
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

NASSAU COUNTY, FLORIDA

UNIVERSITY OF FLORIDA
INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES
AGRICULTURAL EXPERIMENT STATIONS
SOIL SCIENCE DEPARTMENT
FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

SOIL LEGEND

The publication symbols are numeric. Soil map unit names without a slope phase are either nearly level or they are miscellaneous areas.

ALPHABETICAL LIST

SYMBOL	NAME
51	Albany fine sand, 0 to 5 percent slopes
32	Aqualfs,loamy
2	Arents,nearly level
3	Beaches
21	Blanton fine sand, 0 to 5 percent slopes
50	Blanton fine sand, 12 to 20 percent slopes
56	Blanton-Ortega fine sands, 5 to 12 percent slopes
36	Boulogne fine sand
40	Brookman mucky fine sandy loam, 5 to 12 percent slopes
15	Buccaneer clay, frequently flooded
46	Buccaneer clay, rarely flooded
26	Centenarry fine sand, 0 to 5 percent slopes
11	Chaires fine sand
44	Corrola fine sand, 2 to 6 percent slopes, rarely flooded
34	Croatan muck, frequently flooded
39	Evergreen-Leon mucks, depressional
4	Echaw fine sand
16	Ellabelle mucky fine sand, frequently flooded
5	Fripp fine sand, rolling
13	Goldhead fine sand
33	Goldhead-Meadowbrook fine sands, depressional
6	Hurricane-Pottsburg fine sands, 0 to 5 percent slopes
31	Kershaw fine sand, 2 to 8 percent slopes
24	Kingsferry fine sand
7	Kingsland mucky-peat, frequently flooded
8	Kureb fine sand, 0 to 5 percent slopes
30	Kureb-Resota fine sands, rolling
47	Leefield fine sand, 0 to 5 percent slopes
9	Leon fine sand
19	Leon fine sand, tidal
18	Lynn Haven-Wessconnett-Leon complex, depressional
10	Mandarin fine sand
25	Maurepas muck, frequently flooded
53	Meadowbrook fine sand
55	Meadowbrook-Goldhead-Meggett complex, 2 to 5 percent slopes
37	Meggett loamy fine sand
45	Meggett loamy fine sand, depressional
38	Meggett fine sandy loam, rarely flooded
12	Newhan-Corrola, rarely flooded fine sands, rolling
23	Ocilla fine sand, 0 to 5 percent slopes
20	Ortega fine sand, 0 to 5 percent slopes
52	Osier loamy fine sand, frequently flooded
49	Ousley and Mandarin fine sands, occasionally flooded
57	Penney fine sand, 0 to 5 percent slopes
29	Resota fine sand, 0 to 5 pecent slopes
27	Ridgewood fine sand, 0 to 5 percent slopes
14	Rutlege mucky fine sand, frequently flooded
54	Sapelo fine sand
22	Sapelo-Leon fine sands
28	Tisonia mucky-peat, frequently flooded
17	Urban land

NUMERICAL LIST

SYMBOL	NAME
2	Arents, nearly level
3	Beaches
4	Echaw fine sand
5	Fripp fine sand, rolling
6	Hurricane-Pottsburg fine sands, 0 to 5 percent slopes
7	Kingsland mucky-peat, frequently flooded
8	Kureb fine sand, 0 to 5 percent slopes
9	Leon fine sand
10	Mandarin fine sand
11	Chaires fine sand
12	Newhan-Corolla rarely flooded, fine sands, rolling
13	Goldhead fine sand
14	Rutlege mucky fine sand, frequently flooded
15	Buccaneer clay frequently flooded
16	Ellabelle mucky fine sand, frequently flooded
17	Urban land
18	Lynn Haven-Wessconnett-Leon complex, depressional
19	Leon fine sand, tidal
20	Ortega fine sand, 0 to 5 percent slopes
21	Blanton fine sand, 0 to 5 percent slopes
22	Sapelo-Leon fine sands
23	Ocilla fine sand, 0 to 5 percent slopes
24	Kingsferry fine sand
25	Maurepas muck, frequently flooded
26	Centenary fine sand, 0 to 5 percent slopes
27	Ridgewood fine sand, 0 to 5 percent slopes
28	Tisonia mucky-peat, frequently flooded
29	Resota fine sand, 0 to 5 percent slopes
30	Kureb-Resota fine sands, rolling
31	Kershaw fine sand, 2 to 8 percent slopes
32	Aqualfs, loamy
33	Goldhead-Meadowbrook, fine sands, depressional
34	Croatan muck, frequently flooded
36	Boulogne fine sand
37	Meggett loamy fine sand
38	Meggett fine sandy loam, rarely flooded
39	Evergreen-Leon mucks, depressional
40	Brookman mucky fine sandy loam, depressional
44	Corolla fine sand, 2 to 6 percent slopes, rarely flooded
45	Meggett loamy fine sand, depressional
46	Buccaneer clay rarely flooded
47	Leefield fine sand, 0 to 5 percent slopes
49	Ousley and Mandarin fine sands, occasionally flooded
50	Blanton fine sand, 12 to 20 percent slopes
51	Albany fine sand, 0 to 5 percent slopes
52	Osier loamy fine sand, frequently flooded
53	Meadowbrook fine sand
54	Sapelo fine sand
55	Meadowbrook-Goldhead-Meggett complex, 2 to 5 percent slopes
56	Blanton-Ortega fine sands, 5 to 12 percent slopes
57	Penney fine sand, 0 to 5 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

National, state or province
County or parish
Minor civil division
Reservation (national forest or park, state forest or park, and large airport)
Land grant
Limit of soil survey (label)
Field sheet matchline and neatline

AD HOC BOUNDARY (label) — Swift Airport

Small airport, airfield, park, oilfield, cemetery, or flood pool — FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNER (sections and land grants)

ROADS

Divided (median shown if scale permits)
Other roads
Trail

ROAD EMBLEM & DESIGNATIONS

Interstate — 21
Federal — 173
State — 28
County, farm or ranch — 1283

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

Without road
With road
With railroad

DAMS

Large (to scale)
Medium or Small — water — w

PITS

Gravel pit
Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

Farmstead, house (omit in urban areas)
Church
School
Indian mound (label) — Indian Mound
Located object (label) — Tower
Tank (label) — Gas
Wells, oil or gas
Windmill
Kitchen midden

WATER FEATURES

DRAINAGE

Perennial, double line
Perennial, single line
Intermittent
Drainage end
Canals or ditches
Double-line (label) — CANAL
Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

Perennial — water — w
Intermittent — int — i

MISCELLANEOUS WATER FEATURES

Marsh or swamp
Spring
Well, artesian
Well, irrigation
Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — 10 11

ESCARPMENTS

Bedrock (points down slope)
Other than bedrock (points down slope)

SHORT STEEP SLOPE

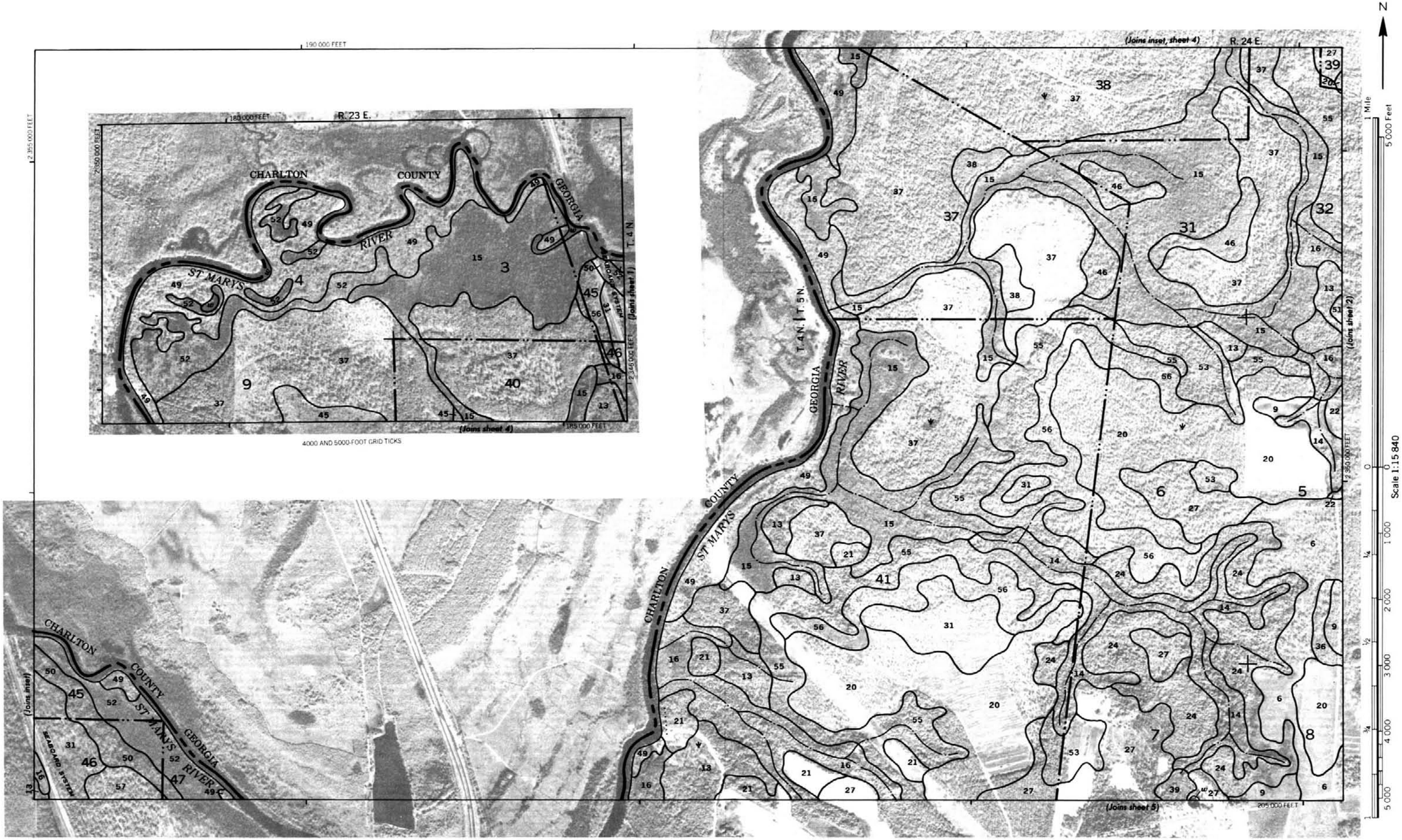
GULLY

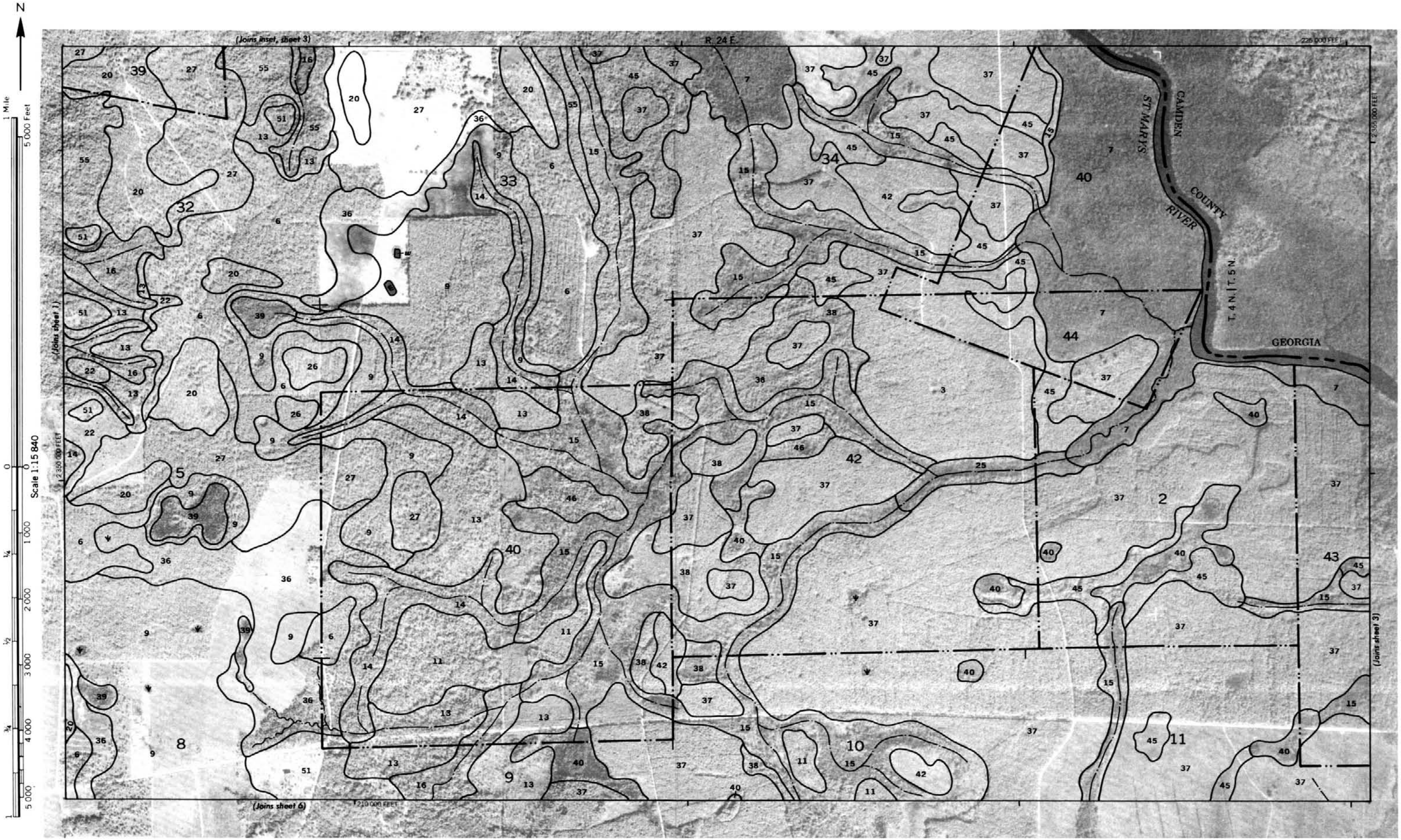
DEPRESSION OR SINK

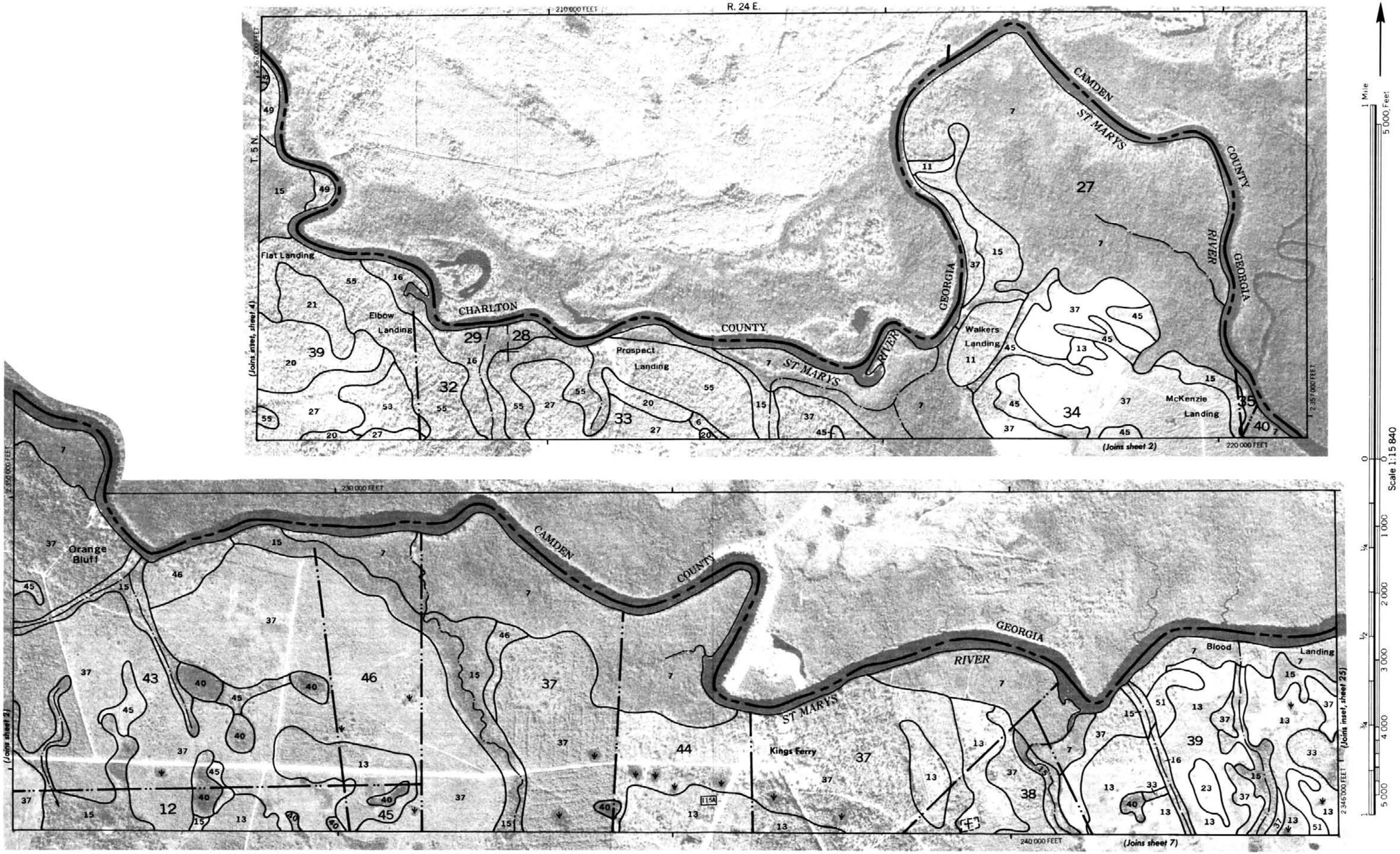
SOIL SAMPLE (normally not shown)

MISCELLANEOUS

Blowout
Clay spot
Gravelly spot
Gumbo, slick or scabby spot (sodic)
Dumps and other similar non soil areas
Prominent hill or peak
Rock outcrop (includes sandstone and shale)
Saline spot
Sandy spot
Severely eroded spot
Slide or slip (tips point upslope)
Stony spot, very stony spot


N
190 000 FEET
2 355 000 FEET
(Joins inset, sheet 4)
R. 24 E.
180 000 FEET
R. 23 E.
2 350 000 FEET
CHARLTON
COUNTY
GEORGIA
ST MARYS
RIVER
T. 4 N.
SEABOARD SYSTEM
(Joins sheet 1)
2 346 000 FEET
(Joins sheet 4)
185 000 FEET
4000 AND 5000-FOOT GRID TICKS
T. 5 N.
T. 4 N.
(Joins sheet 2)
2 350 000 FEET
(Joins sheet 5)
205 000 FEET
(Joins inset)
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
1

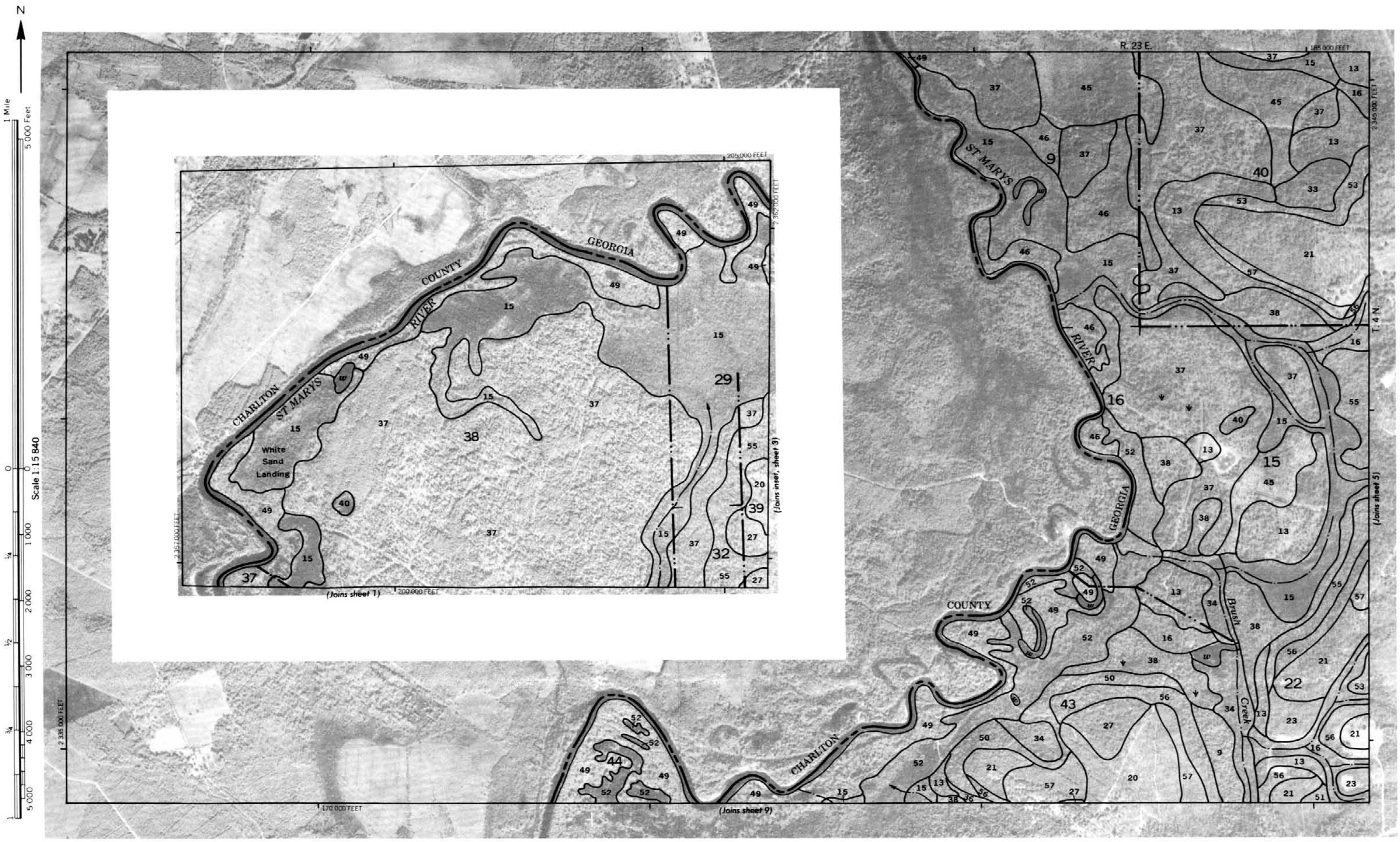

N
1 Mile
5 000 Feet
0
Scale 1:15 840
1 000
¼
2 000
½
3 000
¾
4 000
5 000
(Joins inset, sheet 3)
R. 24 E.
226 000 FEET
2 355 000 FEET
2 350 000 FEET
ST MARYS
RIVER
CAMDEN
COUNTY
T. 4 N. | T. 5 N.
GEORGIA
(Joins sheet 1)
(Joins sheet 3)
(Joins sheet 6)
210 000 FEET

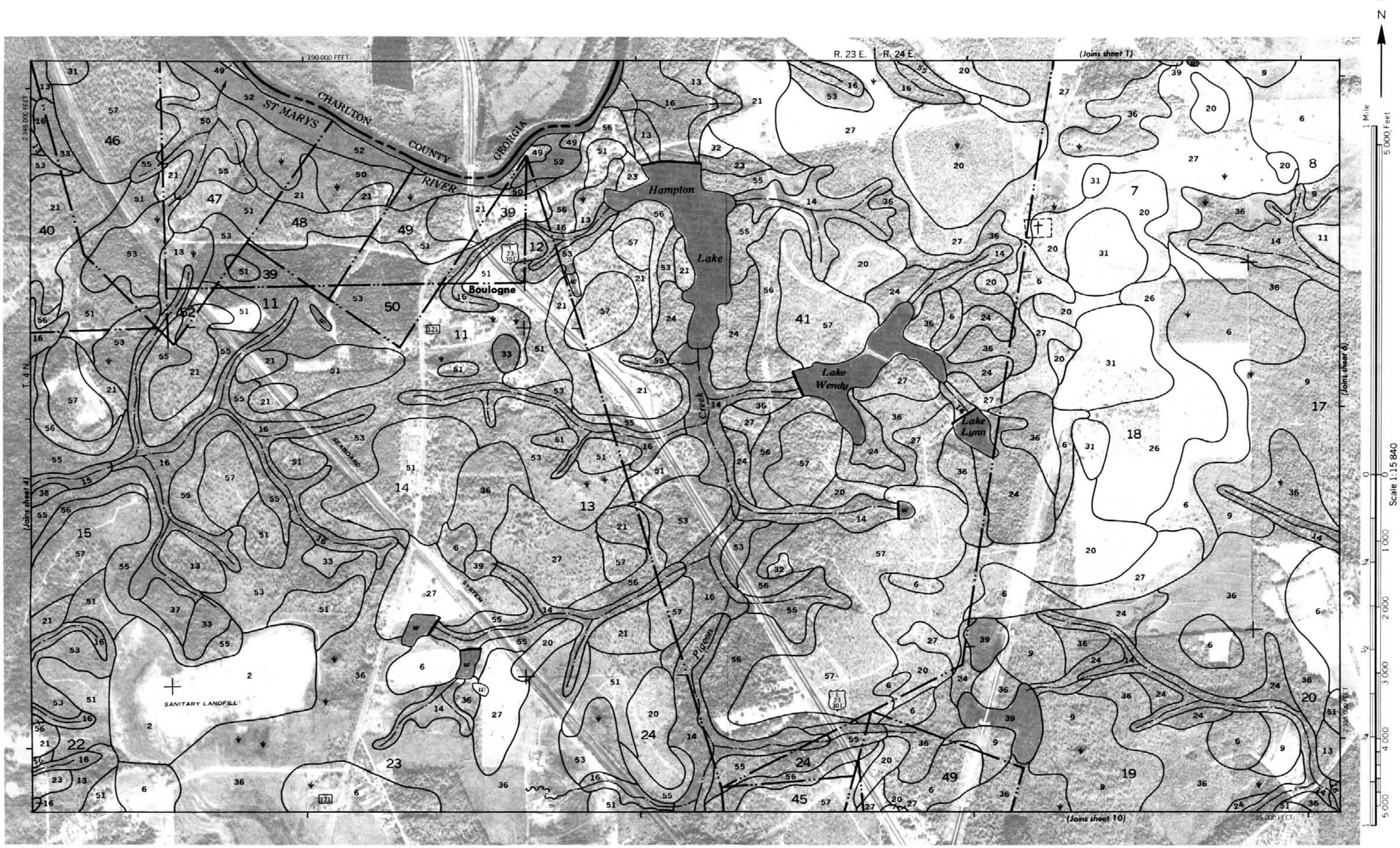

210 000 FEET
R. 24 E.
T. 5 N.
2 362 000 FEET
(Joins inset, sheet 4)
CHARLTON
COUNTY
CAMDEN
COUNTY
GEORGIA
ST MARYS
RIVER
Flat Landing
Elbow Landing
Prospect Landing
Walkers Landing
McKenzie Landing
2 357 000 FEET
(Joins sheet 2)
220 000 FEET
15
49
49
15
55
16
21
39
20
27
53
55
20
27
29
28
32
16
55
55
27
33
55
20
27
6
20
55
15
7
37
45
7
11
37
15
7
27
7
37
45
45
13
11
45
15
45
37
34
37
45
37
35
40
7
2 350 000 FEET
230 000 FEET
Orange Bluff
(Joins sheet 2)
CAMDEN
COUNTY
GEORGIA
ST MARYS
RIVER
Kings Ferry
Blood Landing
(Joins inset, sheet 25)
240 000 FEET
(Joins sheet 7)
2 346 000 FEET
7
37
45
15
46
15
7
37
37
43
45
40
40
45
40
46
37
37
13
12
40
15
13
40
40
45
37
46
15
37
7
37
15
44
13
7
37
37
13
13
13
37
38
7
15
51
13
37
39
16
33
13
40
13
23
37
15
37
13
13
51
13
33
115A
N
1 Mile
5 000 Feet
0
1 000
2 000
3 000
4 000
5 000
0
¼
½
¾
1
Scale 1:15 840

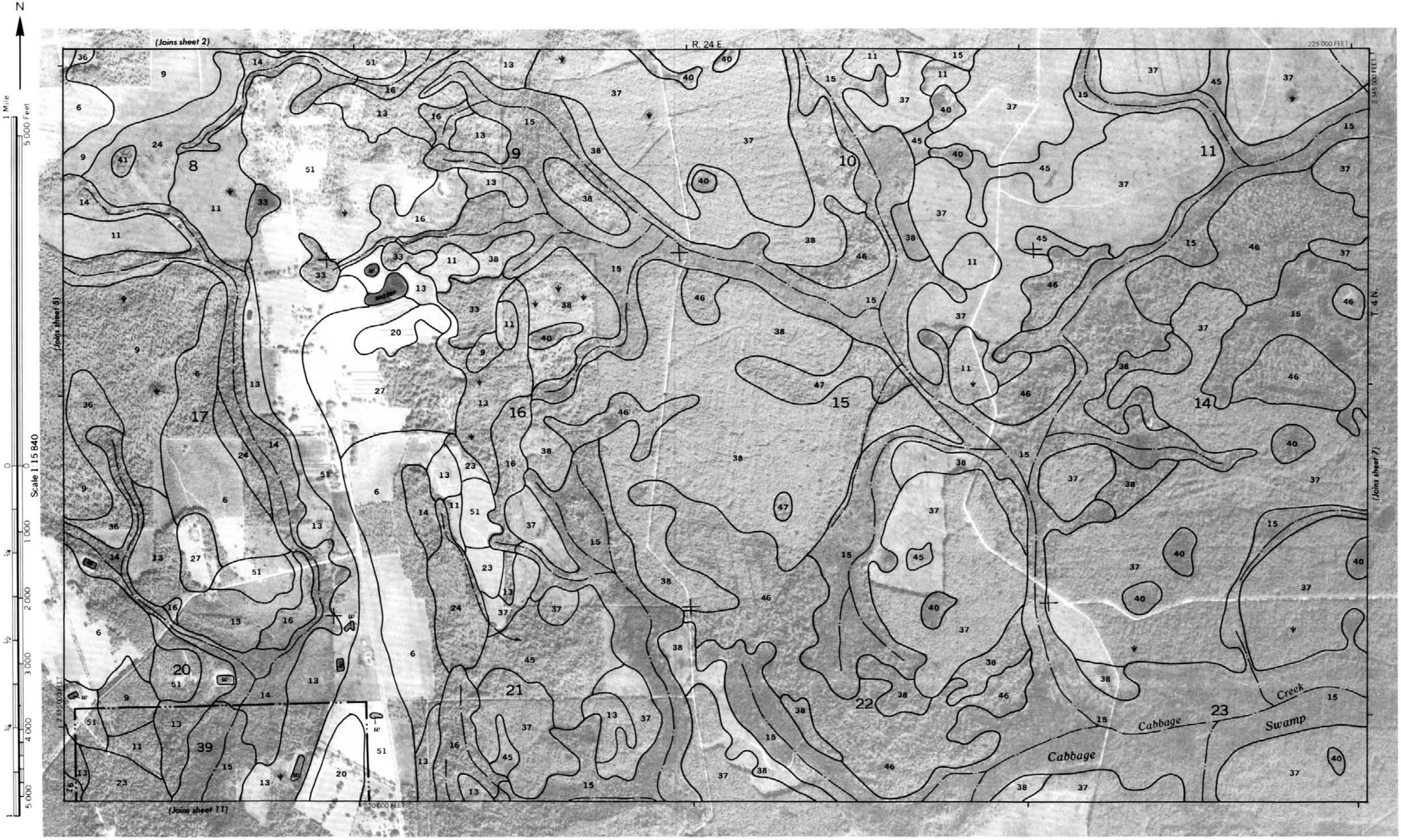
4000 AND 5000-FOOT GRID TICKS

④

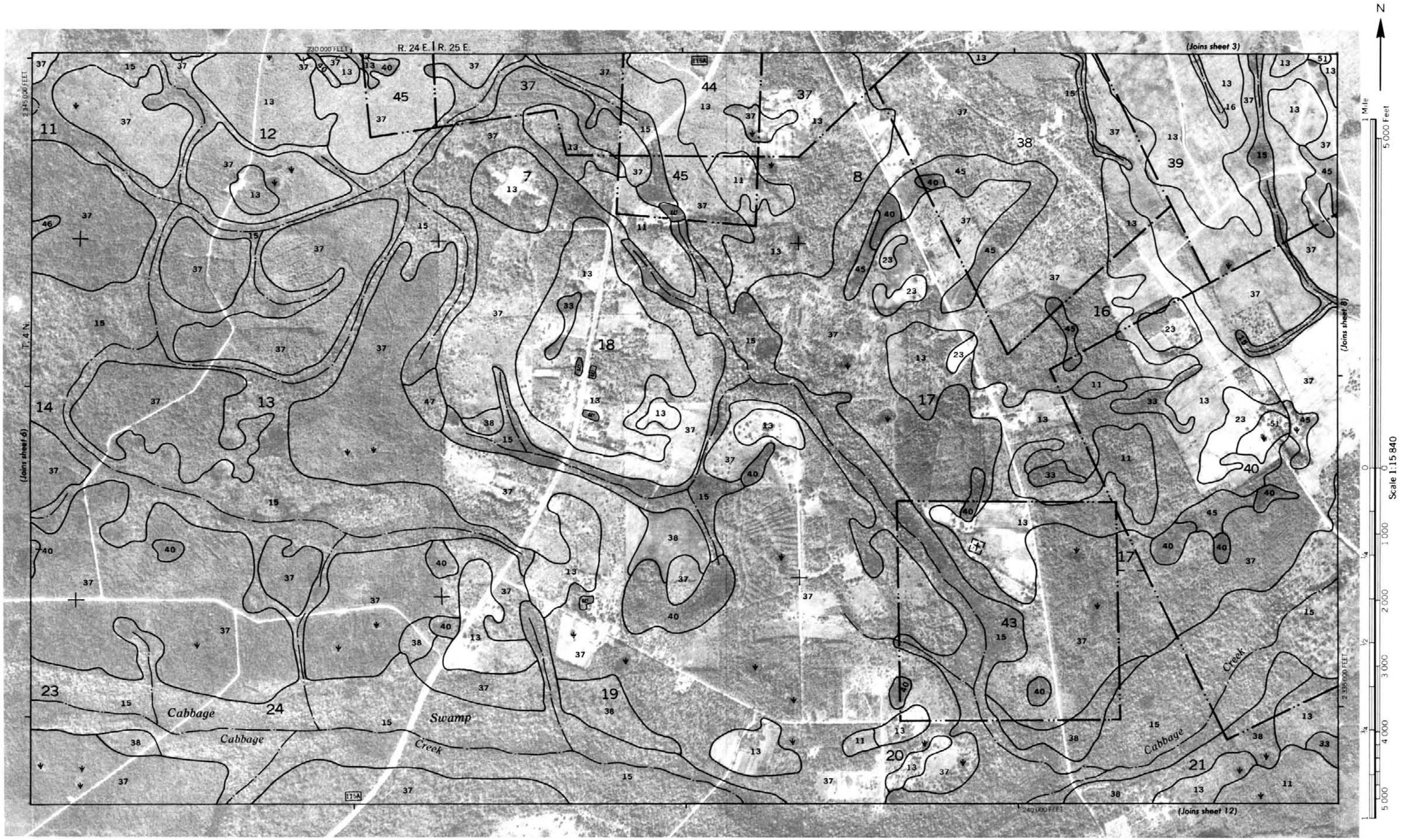
SOIL SURVEY OF NASSAU COUNTY, FLORIDA — SHEET NUMBER 4

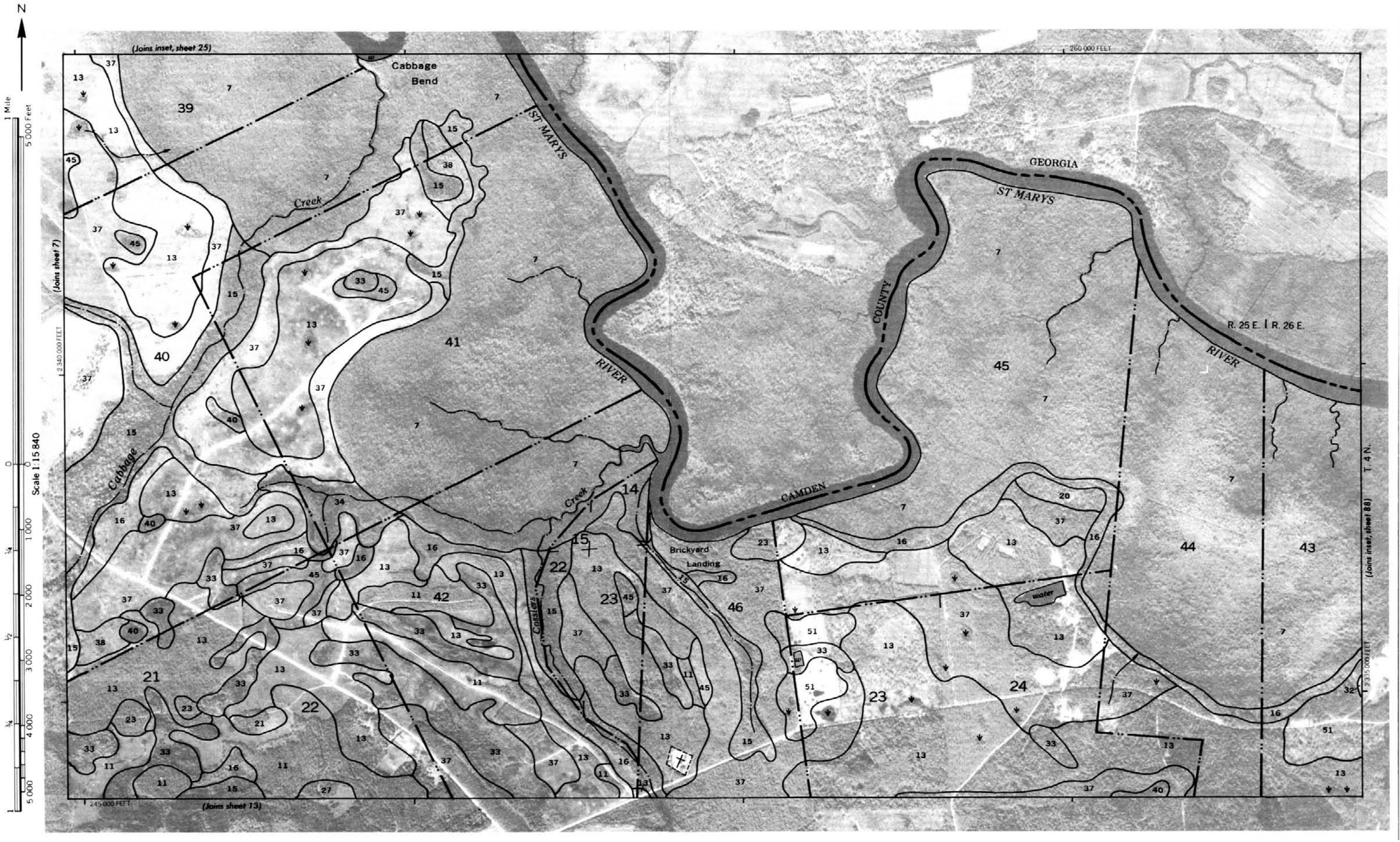

N
1 Mile
5 000 Feet
0
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
1
R. 23 E.
185 000 FEET
2 345 000 FEET
T. 4 N.
(Joins sheet 5)
(Joins sheet 9)
170 000 FEET
2 335 000 FEET
ST MARYS
RIVER
GEORGIA
COUNTY
CHARLTON
Brush
Creek
205 000 FEET
2 362 000 FEET
(Joins inset, sheet 3)
(Joins sheet 1)
200 000 FEET
2 357 000 FEET
CHARLTON
COUNTY
GEORGIA
ST MARYS
RIVER
White
Sand
Landing
w
9
13
15
16
20
21
22
23
27
29
32
33
34
36
37
38
39
40
43
44
45
46
49
50
51
52
53
55
56
57

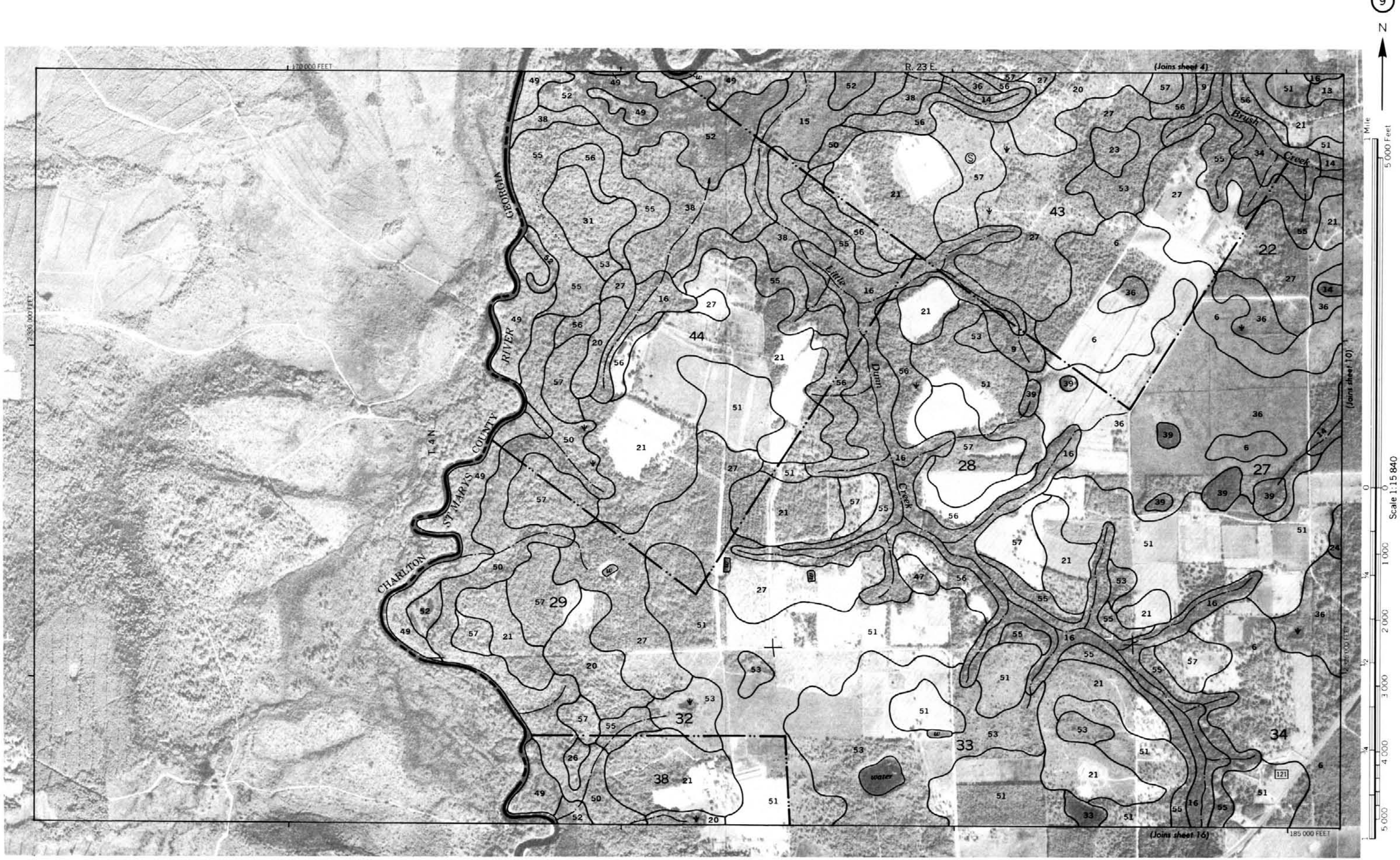

5
N
(Joins sheet 1)
(Joins sheet 4)
(Joins sheet 6)
(Joins sheet 10)
R. 23 E.
R. 24 E.
T. 4 N.
190 000 FEET
205 000 FEET
2 345 000 FEET
2 330 000 FEET
CHARLTON COUNTY GEORGIA
ST MARYS RIVER
Hampton Lake
Lake Wendy
Lake Lynn
Pigeon Creek
Boulogne
SEABOARD SYSTEM
SANITARY LANDFILL
1 23 301
121
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
0
1 000
2 000
3 000
4 000
5 000

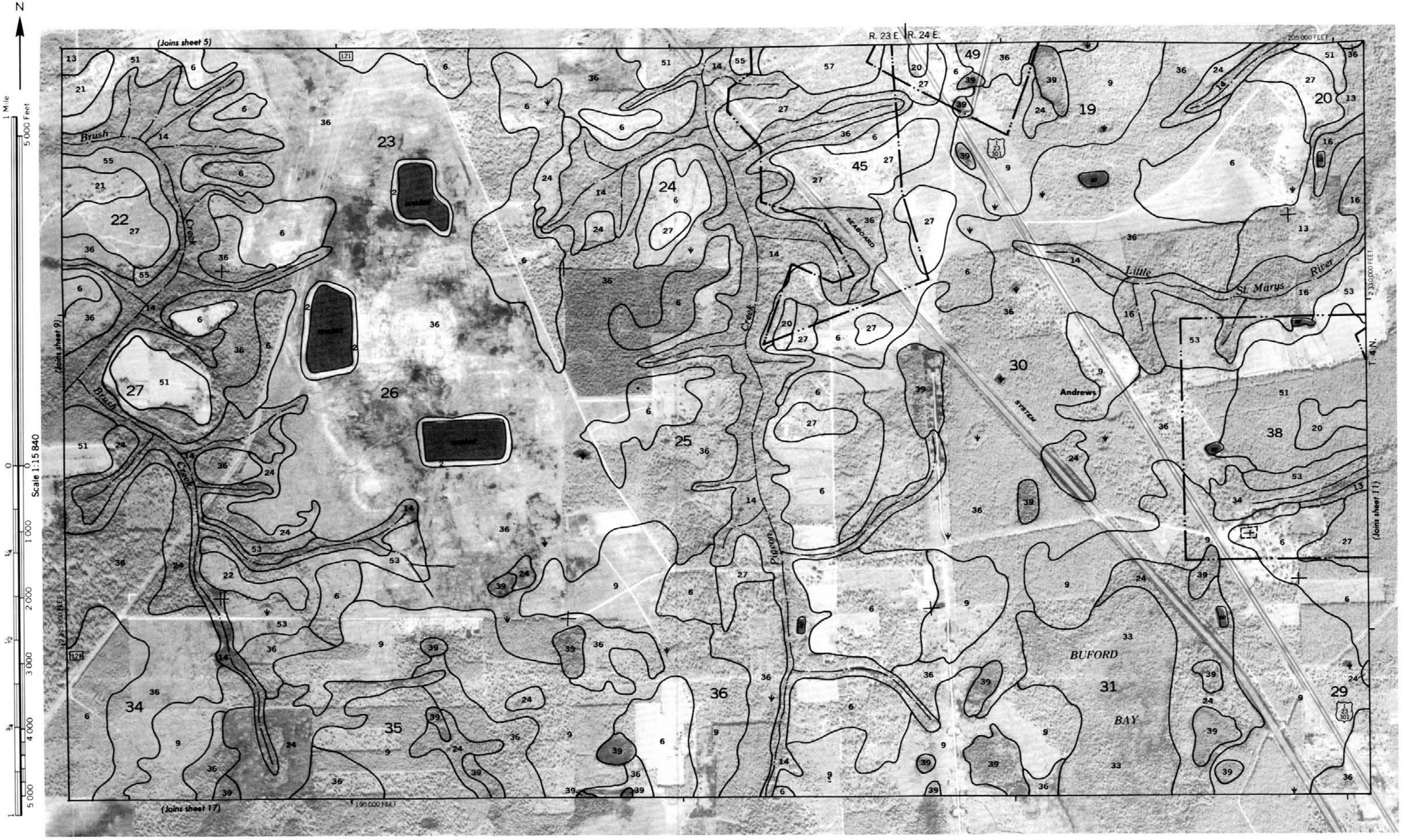

N
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
(Joins sheet 2)
R. 24 E.
225 000 FEET
2 345 000 FEET
T. 4 N.
(Joins sheet 7)
(Joins sheet 5)
(Joins sheet 11)
210 000 FEET
2 335 000 FEET
water
w
Cabbage Creek
Cabbage Swamp
Cabbage

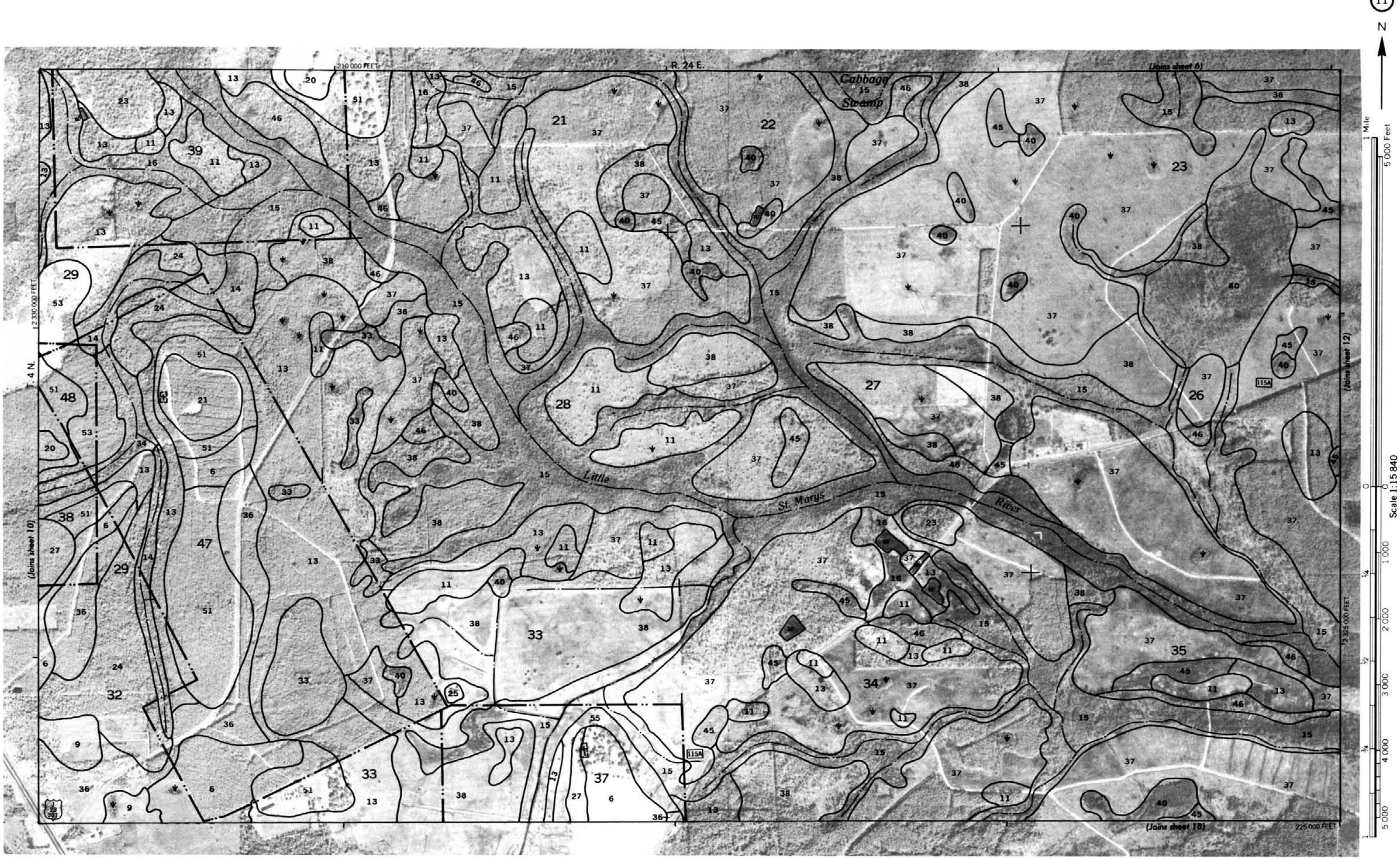
SOIL SURVEY OF NASSAU COUNTY, FLORIDA — SHEET NUMBER 7


N
(Joins sheet 3)
(Joins sheet 6)
(Joins sheet 8)
(Joins sheet 12)
R. 24 E.
R. 25 E.
T. 4 N.
230 000 FEET
240 000 FEET
2 345 000 FEET
2 335 000 FEET
115A
Cabbage
Swamp
Cabbage
Creek
Cabbage
Creek
7
8
11
12
13
14
16
17
18
19
20
21
23
24
38
39
43
44
45
1 Mile
5 000 Feet
0
¼
½
¾
0
1 000
2 000
3 000
4 000
5 000
Scale 1:15 840

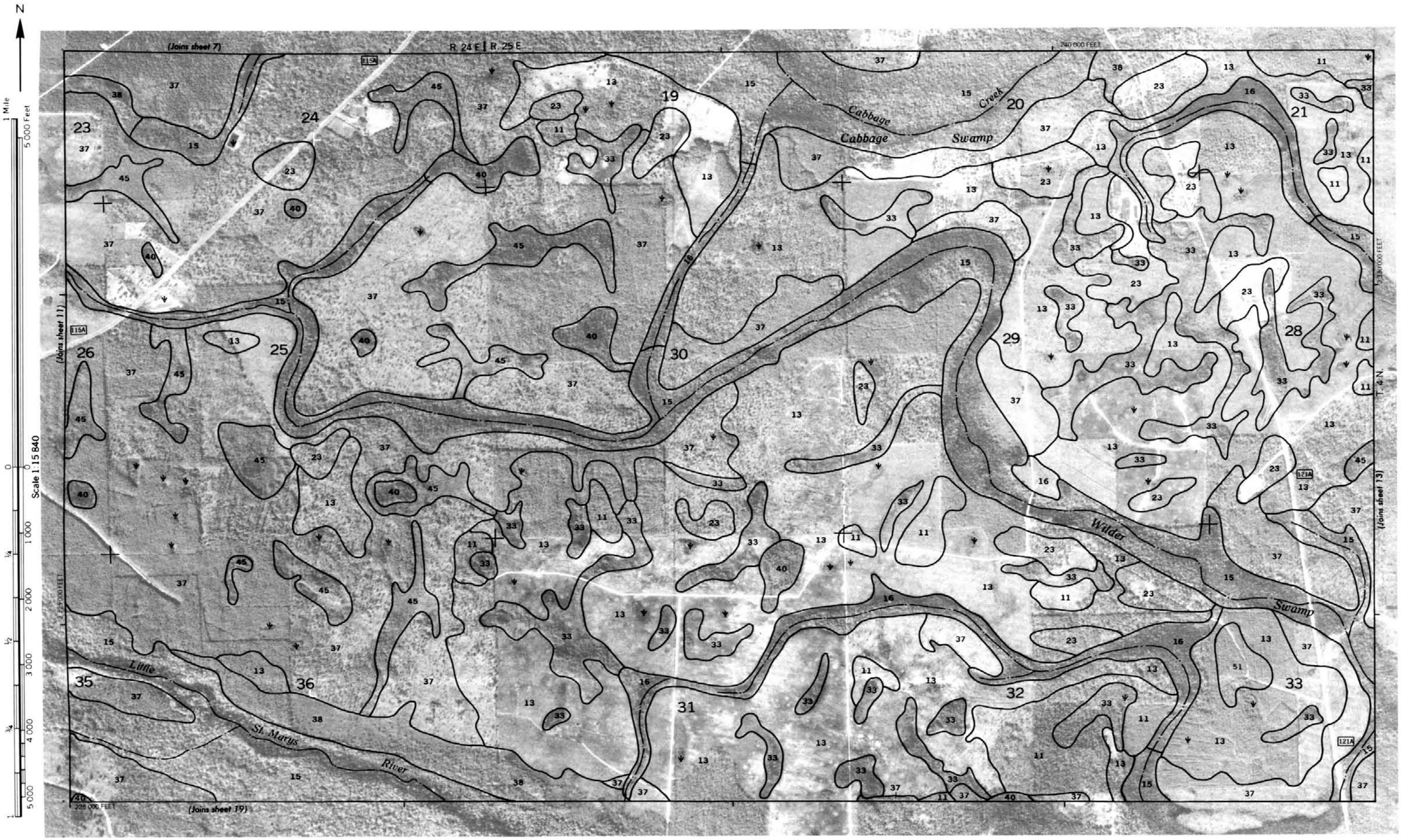

N
1 Mile
5 000 Feet
0
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
1
(Joins inset, sheet 25)
(Joins sheet 7)
(Joins sheet 13)
(Joins inset, sheet 88)
260 000 FEET
245 000 FEET
2 340 000 FEET
2 335 000 FEET
Cabbage Bend
Cabbage Creek
ST MARYS RIVER
GEORGIA
CAMDEN COUNTY
Cosslers Creek
Brickyard Landing
water
R. 25 E.
R. 26 E.
T. 4 N.

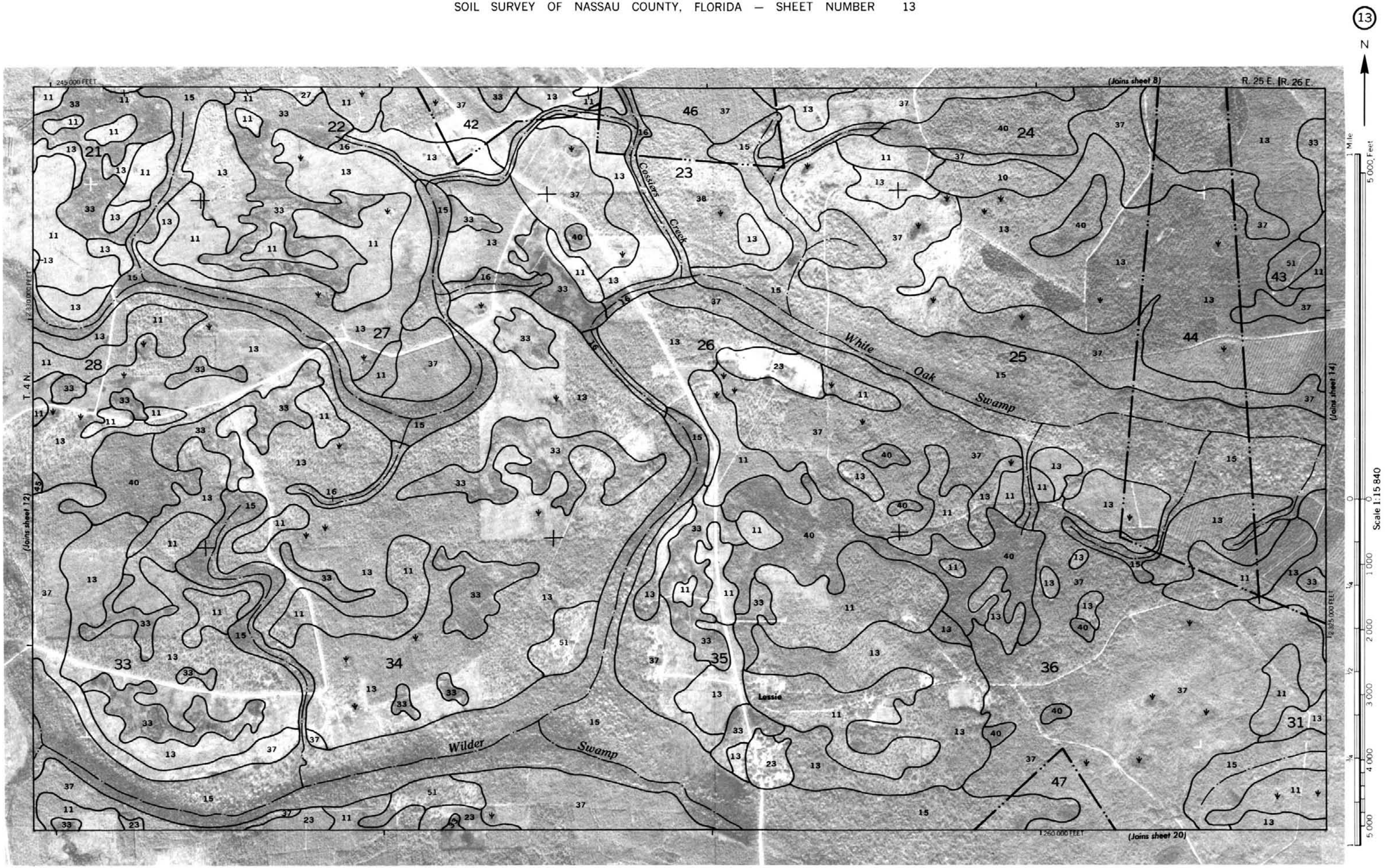

9
N
(Joins sheet 4)
(Joins sheet 10)
(Joins sheet 16)
R. 23 E.
T. 4 N.
170 000 FEET
2 330 000 FEET
185 000 FEET
GEORGIA
CHARLTON COUNTY
ST MARYS RIVER
Little Dunn Creek
Brush Creek
43
44
22
28
27
29
32
33
34
38
water
121
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000


N
1 Mile
5 000 Feet
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
Scale 1:15 840
(Joins sheet 5)
(Joins sheet 9)
(Joins sheet 11)
(Joins sheet 17)
R. 23 E.
R. 24 E.
T. 4 N.
205 000 FEET
2 330 000 FEET
2 325 000 FEET
190 000 FEET
121
23
301
Brush
Creek
Brush
Creek
Pigeon
Creek
Little
St. Marys
River
SEABOARD
SYSTEM
Andrews
BUFORD
BAY
water
2
6
9
13
14
16
19
20
21
22
23
24
25
26
27
29
30
31
33
34
35
36
38
39
45
49
51
53
55
57

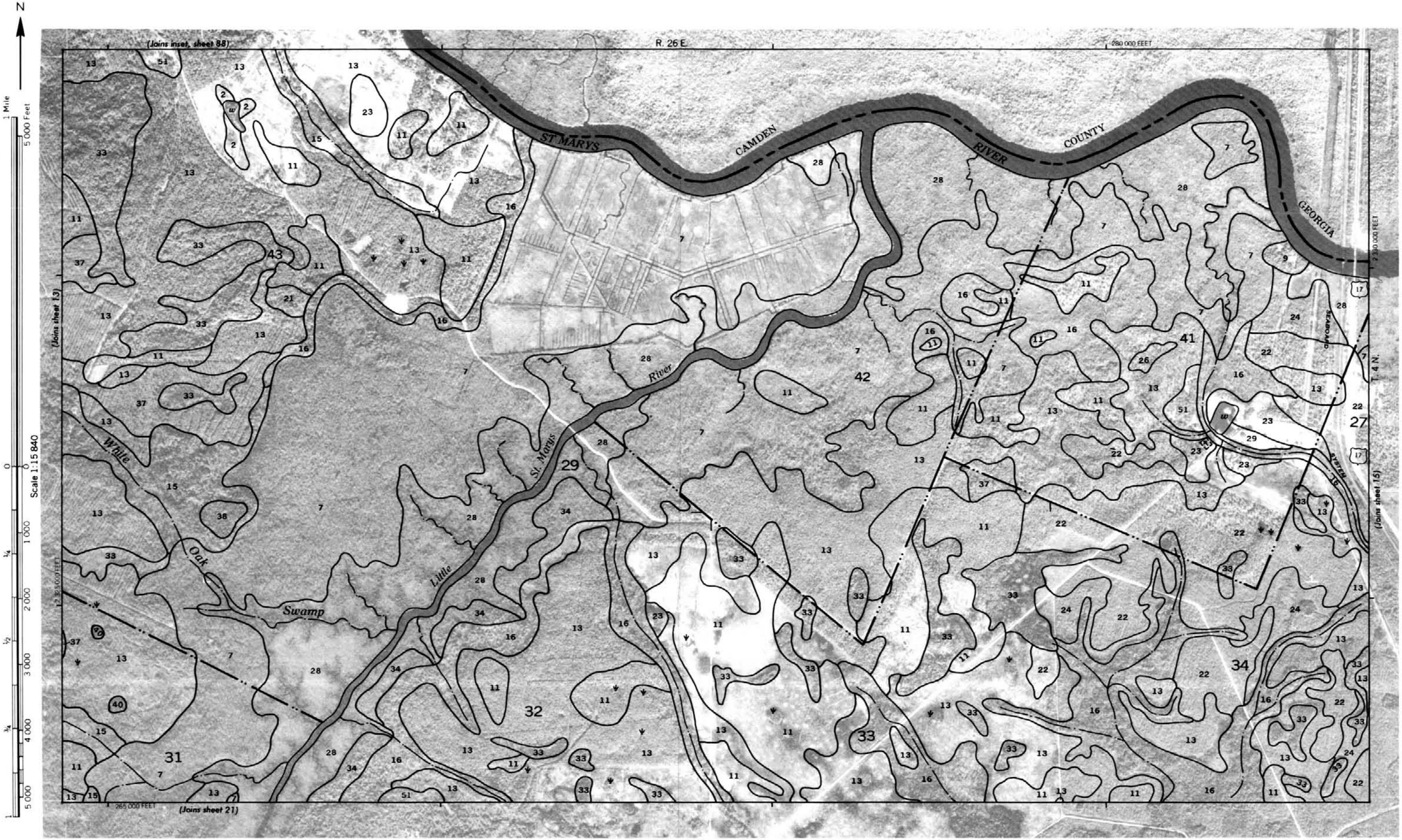

11
N
R. 24 E.
210 000 FEET
(Joins sheet 6)
(Joins sheet 12)
(Joins sheet 18)
(Joins sheet 10)
T. 4 N.
2 330 000 FEET
2 325 000 FEET
225 000 FEET
Cabbage Swamp
Little St. Marys River
115A
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1
0
1 000
2 000
3 000
4 000
5 000

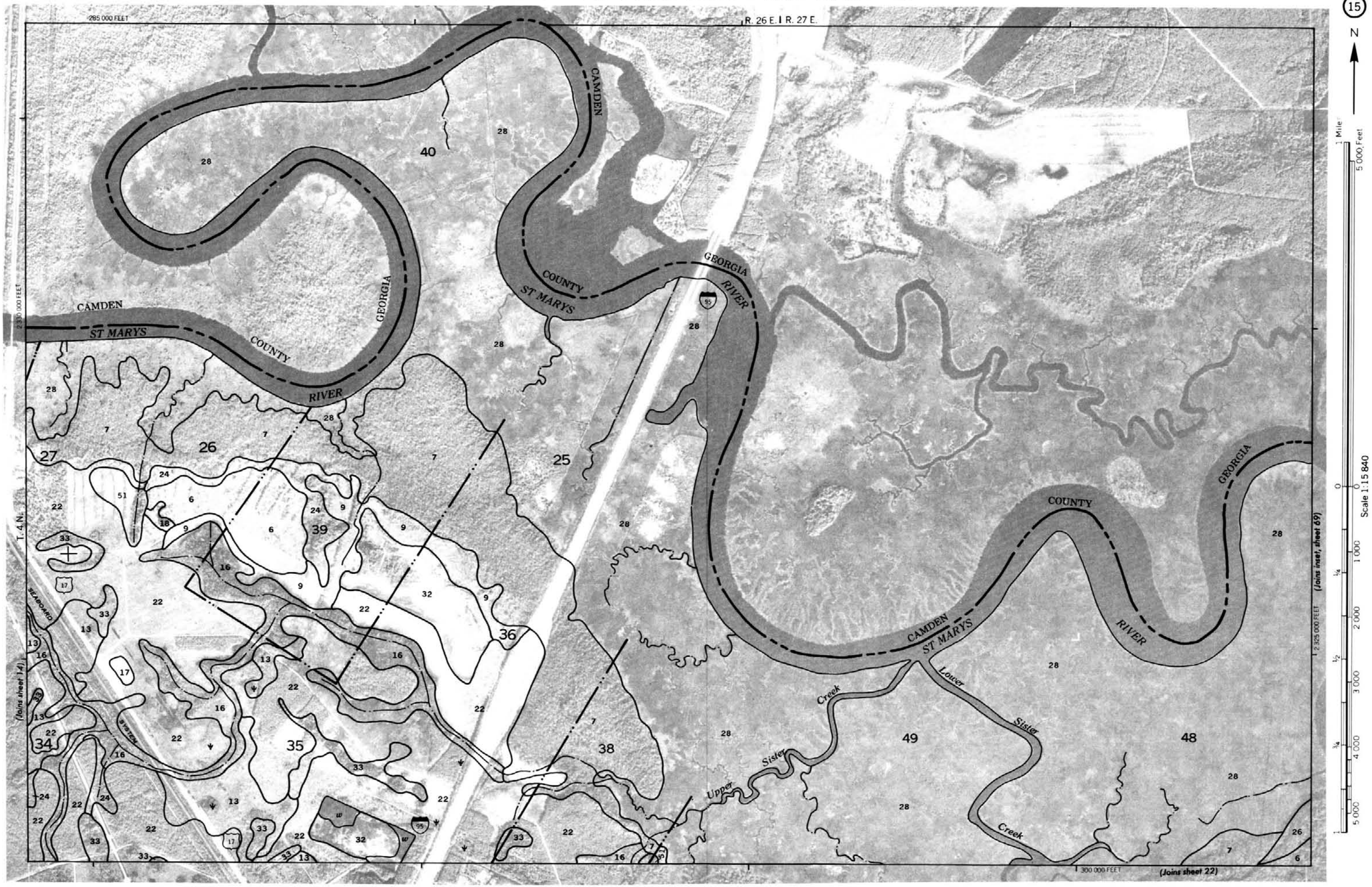
⑫


N
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
0
¼
½
¾
1
(Joins sheet 7)
R. 24 E. | R. 25 E.
240 000 FEET
(Joins sheet 11)
(Joins sheet 13)
(Joins sheet 19)
225 000 FEET
2 330 000 FEET
2 325 000 FEET
T. 4 N.
115A
121A
Cabbage Creek
Cabbage Swamp
Wilder Swamp
Little St. Marys River
19
20
21
23
24
25
26
28
29
30
31
32
33
35
36
11
13
15
16
23
33
37
38
40
45
51


13
N
(Joins sheet 8)
R. 25 E. | R. 26 E.
245 000 FEET
T. 4 N.
(Joins sheet 12)
(Joins sheet 14)
(Joins sheet 20)
1 260 000 FEET
White Oak Swamp
Wilder Swamp
Cassiers Creek
Lessie
21
22
23
24
25
26
27
28
31
33
34
35
36
42
43
44
46
47
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1 000
2 000
3 000
4 000
5 000

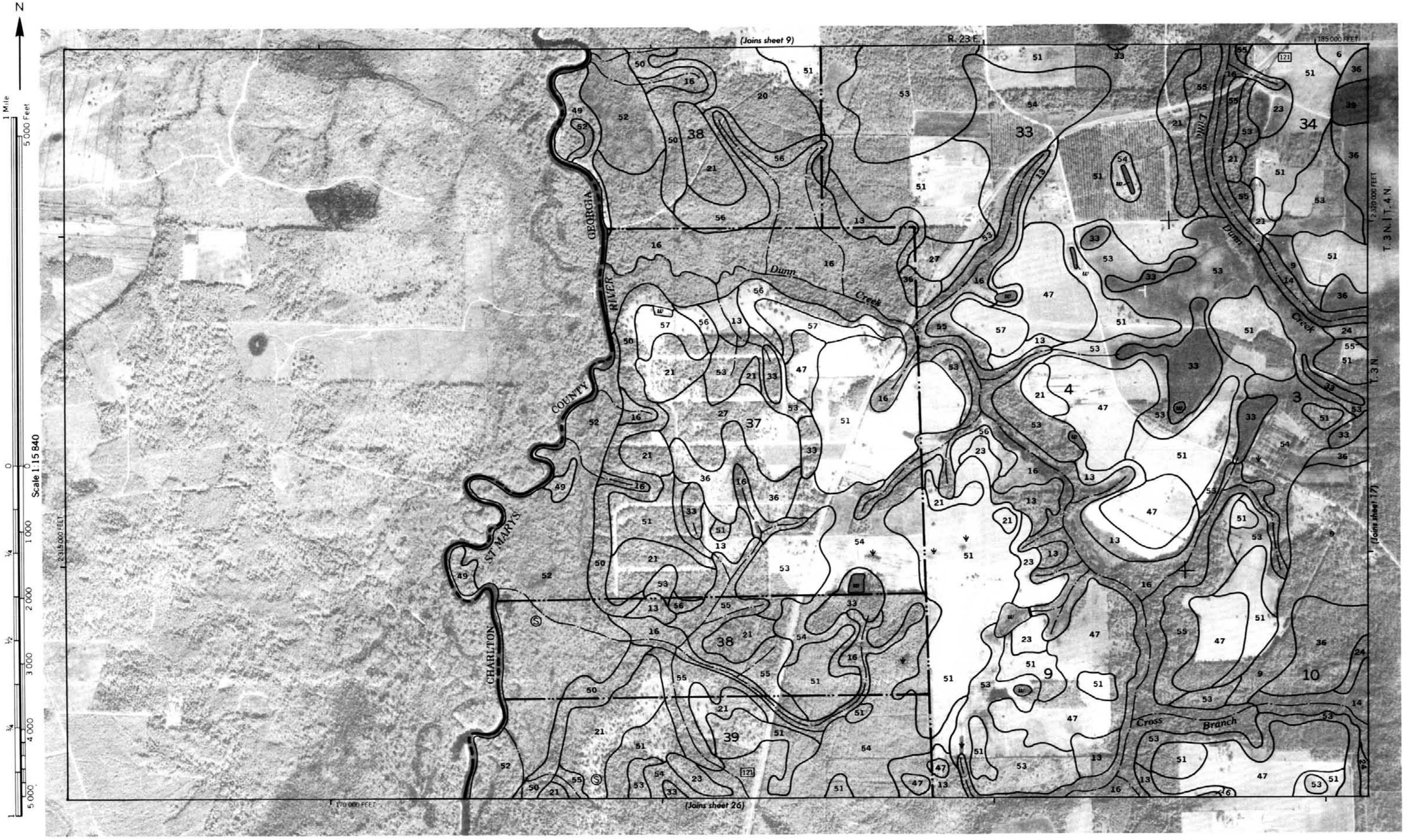
(14)

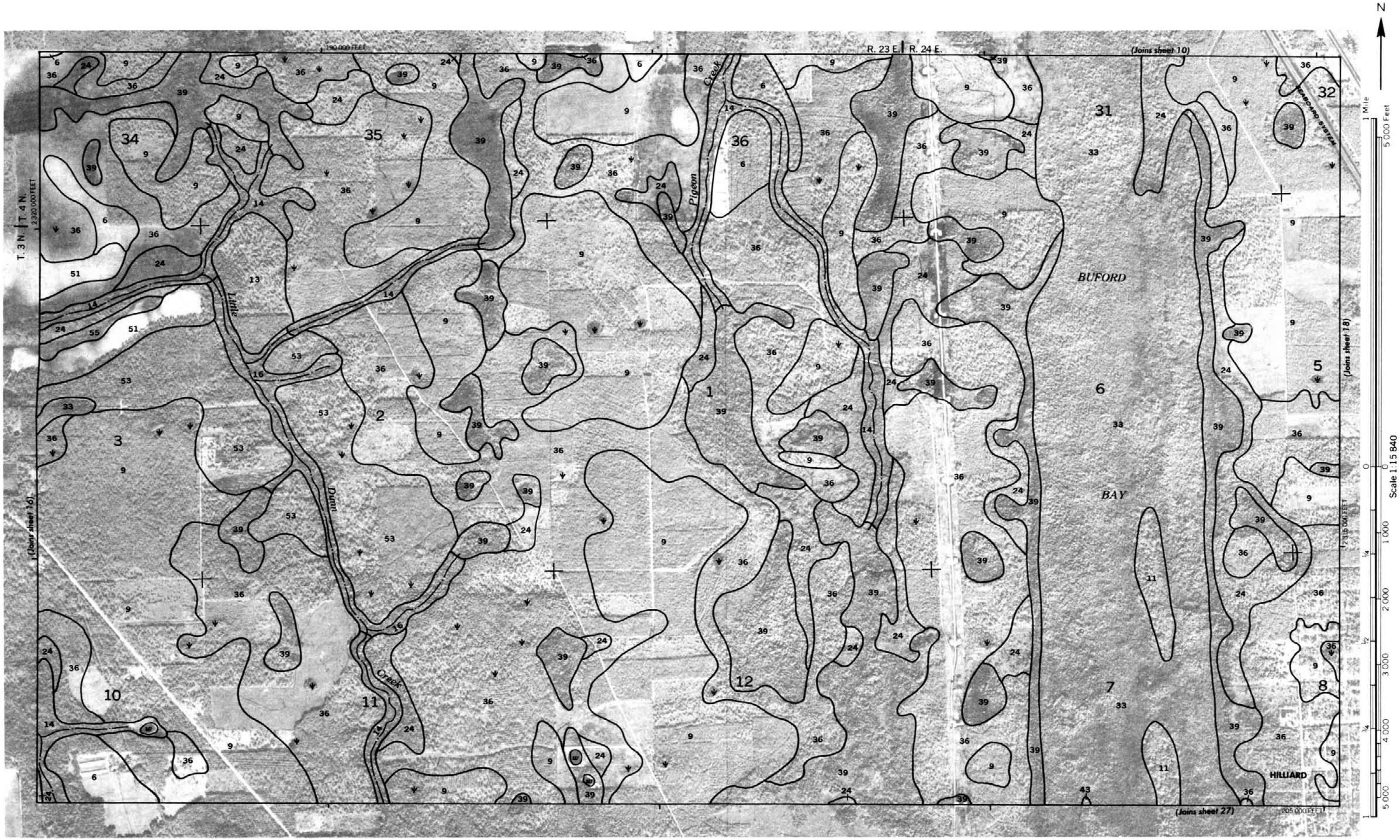

N
Scale 1:15 840
1 Mile
5 000 Feet
(Joins inset, sheet 88)
(Joins sheet 13)
(Joins sheet 15)
(Joins sheet 21)
R. 26 E.
T. 4 N.
280 000 FEET
265 000 FEET
ST MARYS RIVER
CAMDEN COUNTY
GEORGIA
St. Marys River
Little St. Marys
White Oak Swamp
SEABOARD
SYSTEM
17
29
42
43
41
27
34
32
31
33


15
N
285 000 FEET
R. 26 E. | R. 27 E.
2 330 000 FEET
2 325 000 FEET
300 000 FEET
T. 4 N.
CAMDEN
ST MARYS
COUNTY
GEORGIA
RIVER
Upper Sister Creek
Lower Sister Creek
SEABOARD
SYSTEM
95
17
(Joins sheet 14)
(Joins inset, sheet 69)
(Joins sheet 22)
Scale 1:15 840
1 Mile
¾
½
¼
0
5 000 Feet
4 000
3 000
2 000
1 000
28
40
7
26
27
25
24
51
6
22
18
9
39
33
16
32
36
13
17
35
38
49
48
34
w

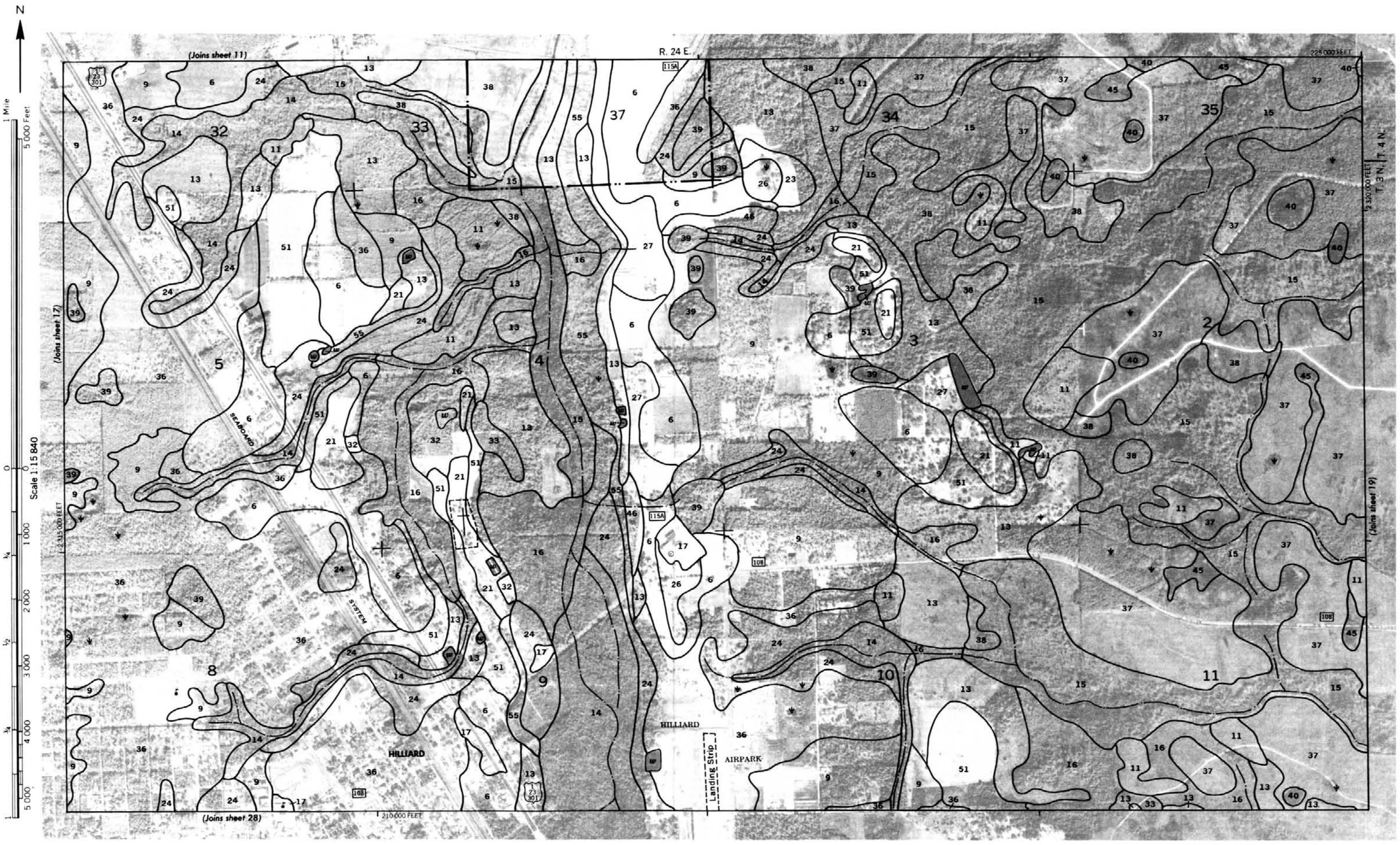
⑯

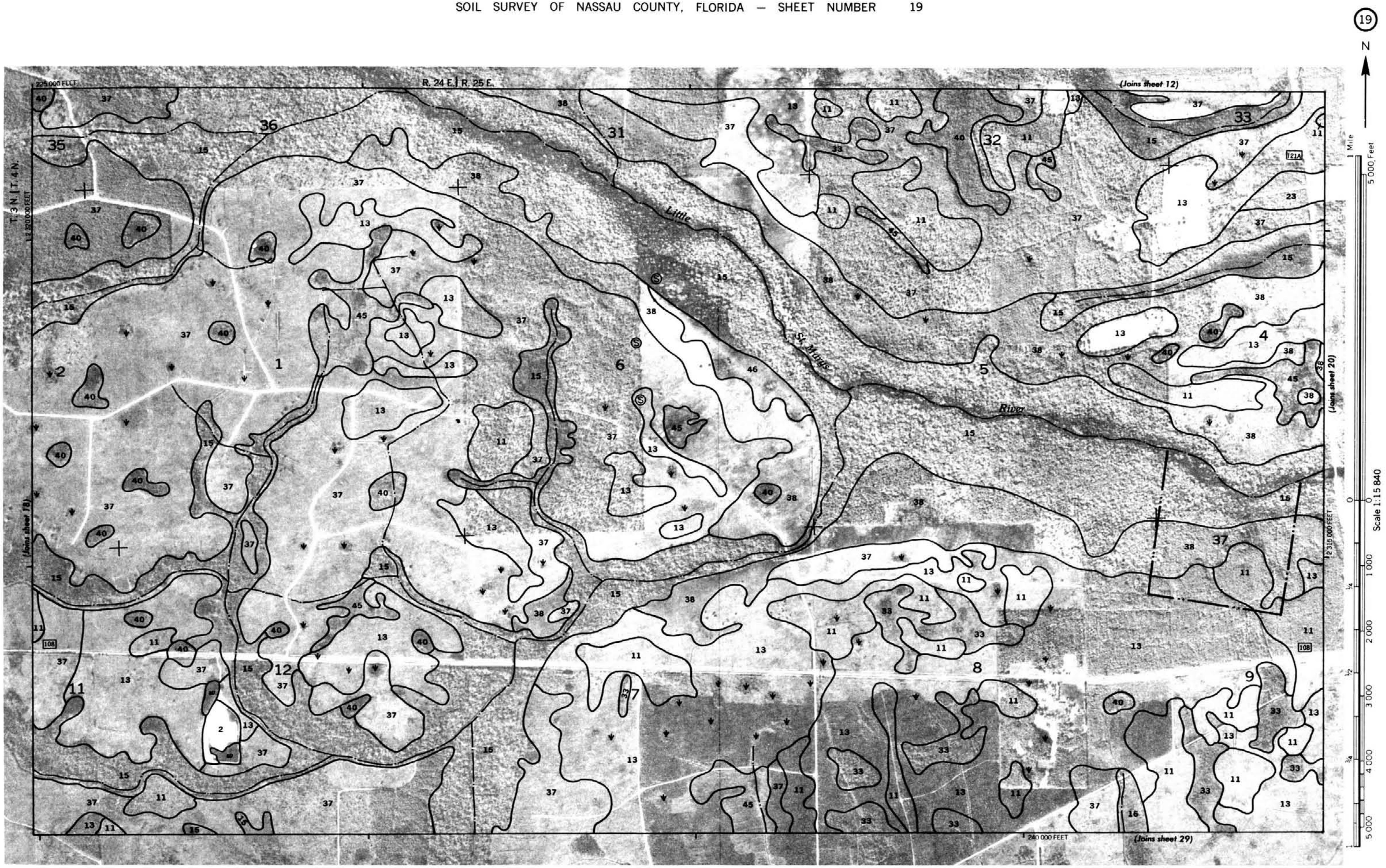
SOIL SURVEY OF NASSAU COUNTY, FLORIDA — SHEET NUMBER 16

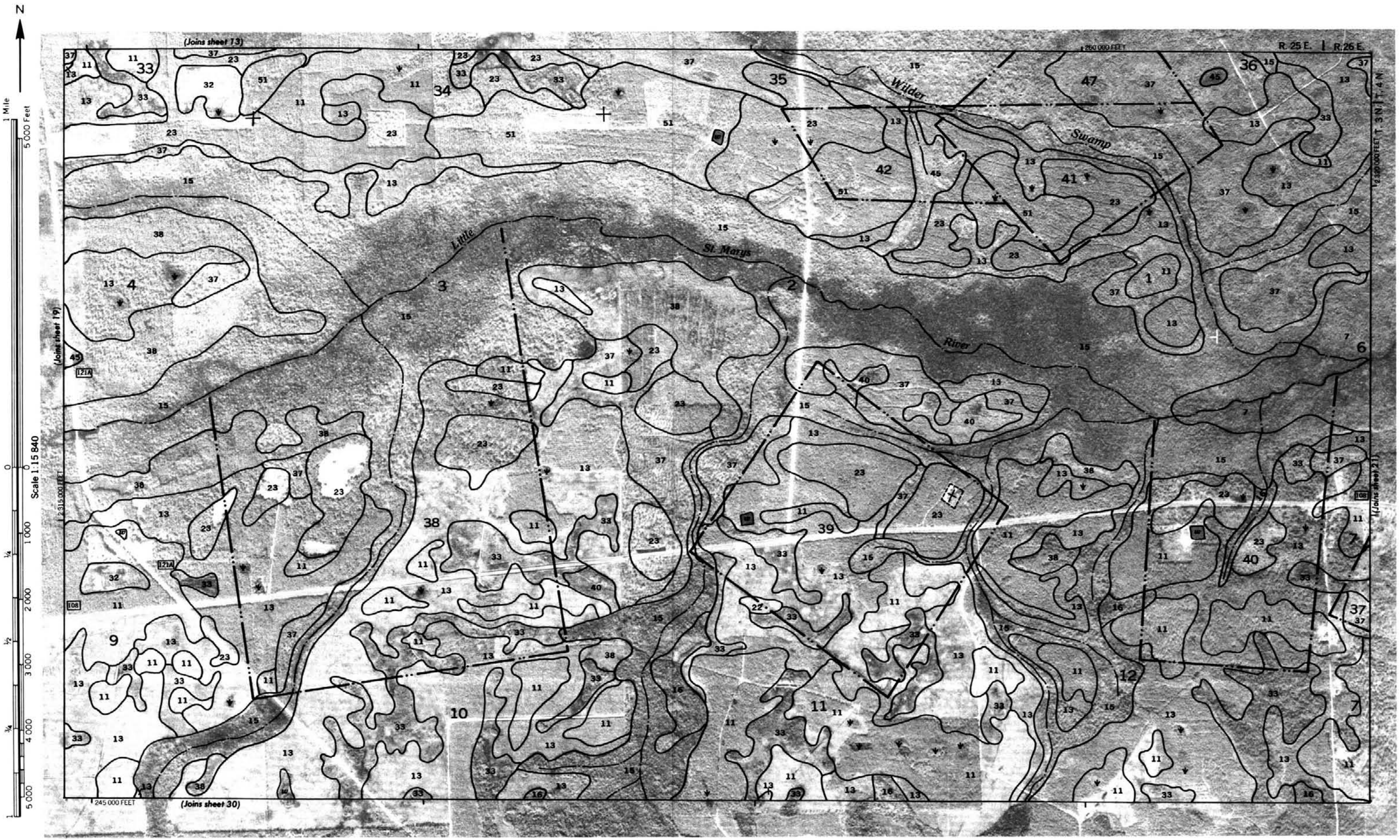

N
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
¼
2 000
½
3 000
¾
4 000
5 000
(Joins sheet 9)
R. 23 E.
185 000 FEET
2 320 000 FEET
T. 3 N. | T. 4 N.
T. 3 N.
(Joins sheet 17)
(Joins sheet 26)
170 000 FEET
2 315 000 FEET
GEORGIA
ST MARYS
RIVER
COUNTY
CHARLTON
Dunn
Creek
Little
Dunn
Creek
Cross
Branch
121
S
w
3
4
9
10
33
34
37
38
39
6
13
14
16
20
21
23
24
27
33
36
47
49
50
51
52
53
54
55
56
57

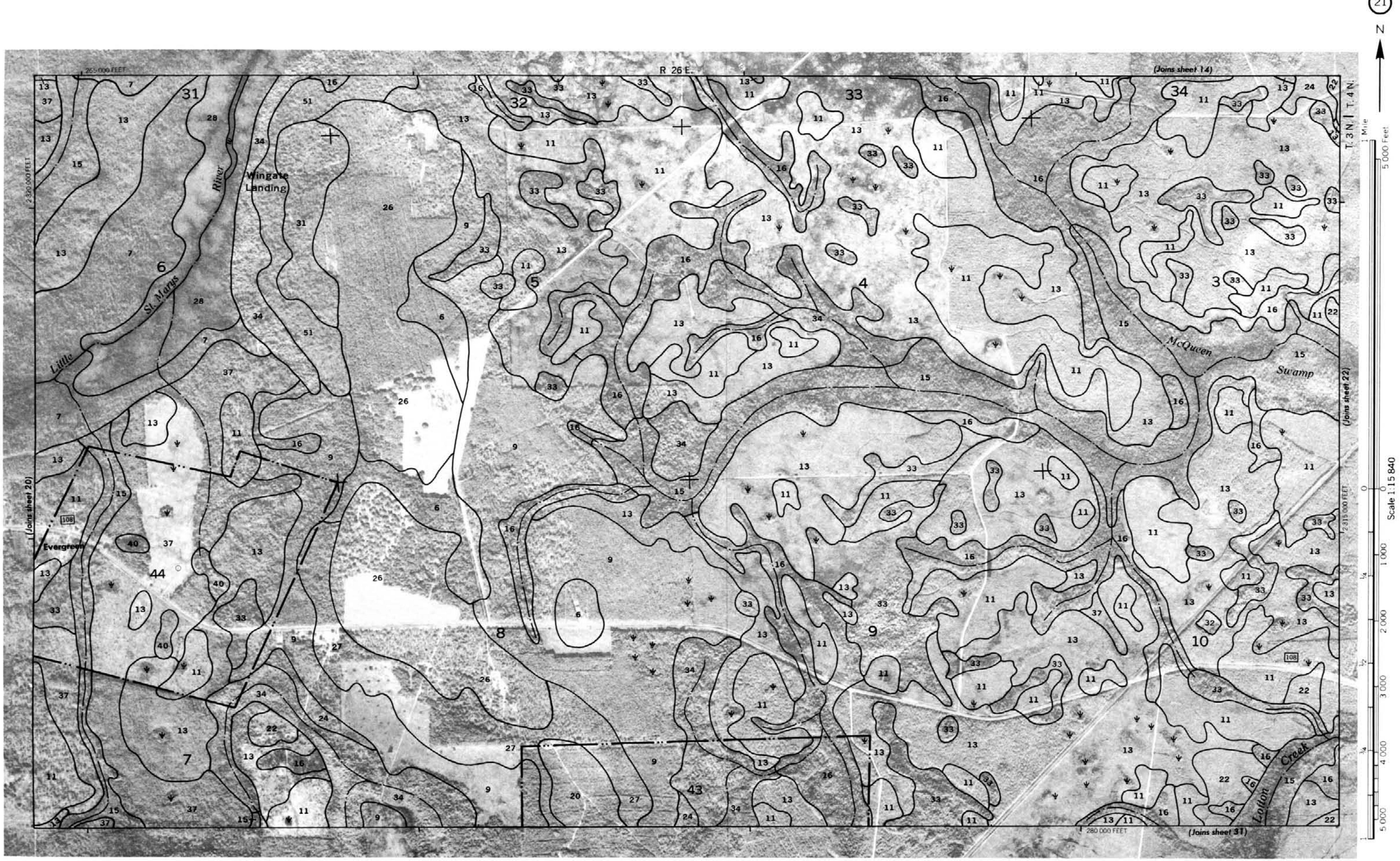

N
R. 23 E. | R. 24 E.
(Joins sheet 10)
(Joins sheet 18)
(Joins sheet 27)
(Joins sheet 16)
T. 3 N. | T. 4 N.
2 320 000 FEET
190 000 FEET
205 000 FEET
2 310 000 FEET
Little
Dunn
Creek
Pigeon
Creek
SEABOARD SYSTEM
BUFORD
BAY
HILLIARD
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1
0
1 000
2 000
3 000
4 000
5 000

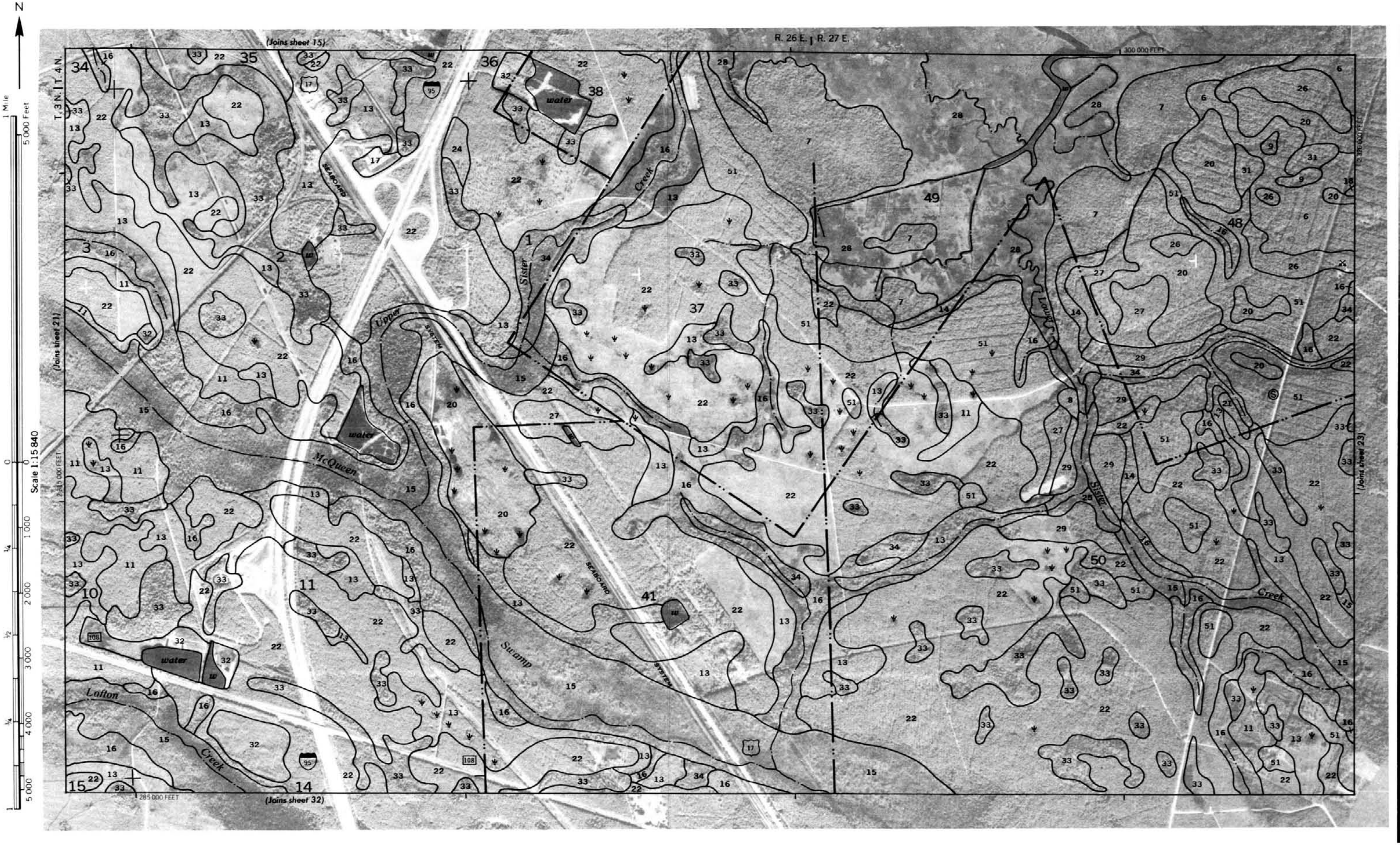
SOIL SURVEY OF NASSAU COUNTY, FLORIDA — SHEET NUMBER 18


N
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1 000
2 000
3 000
4 000
5 000
(Joins sheet 11)
(Joins sheet 17)
(Joins sheet 19)
(Joins sheet 28)
R. 24 E.
T. 3 N.
T. 4 N.
225 000 FEET
2 320 000 FEET
2 315 000 FEET
210 000 FEET
SEABOARD
SYSTEM
HILLIARD
HILLIARD
AIRPARK
Landing Strip
23
301
115A
108


19
N
225 000 FEET
R. 24 E. | R. 25 E.
(Joins sheet 12)
T. 3 N. | T. 4 N.
1 320 000 FEET
(Joins sheet 18)
(Joins sheet 20)
(Joins sheet 29)
240 000 FEET
12 315 000 FEET
Little
St. Marys
River
121A
108
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1 000
2 000
3 000
4 000
5 000

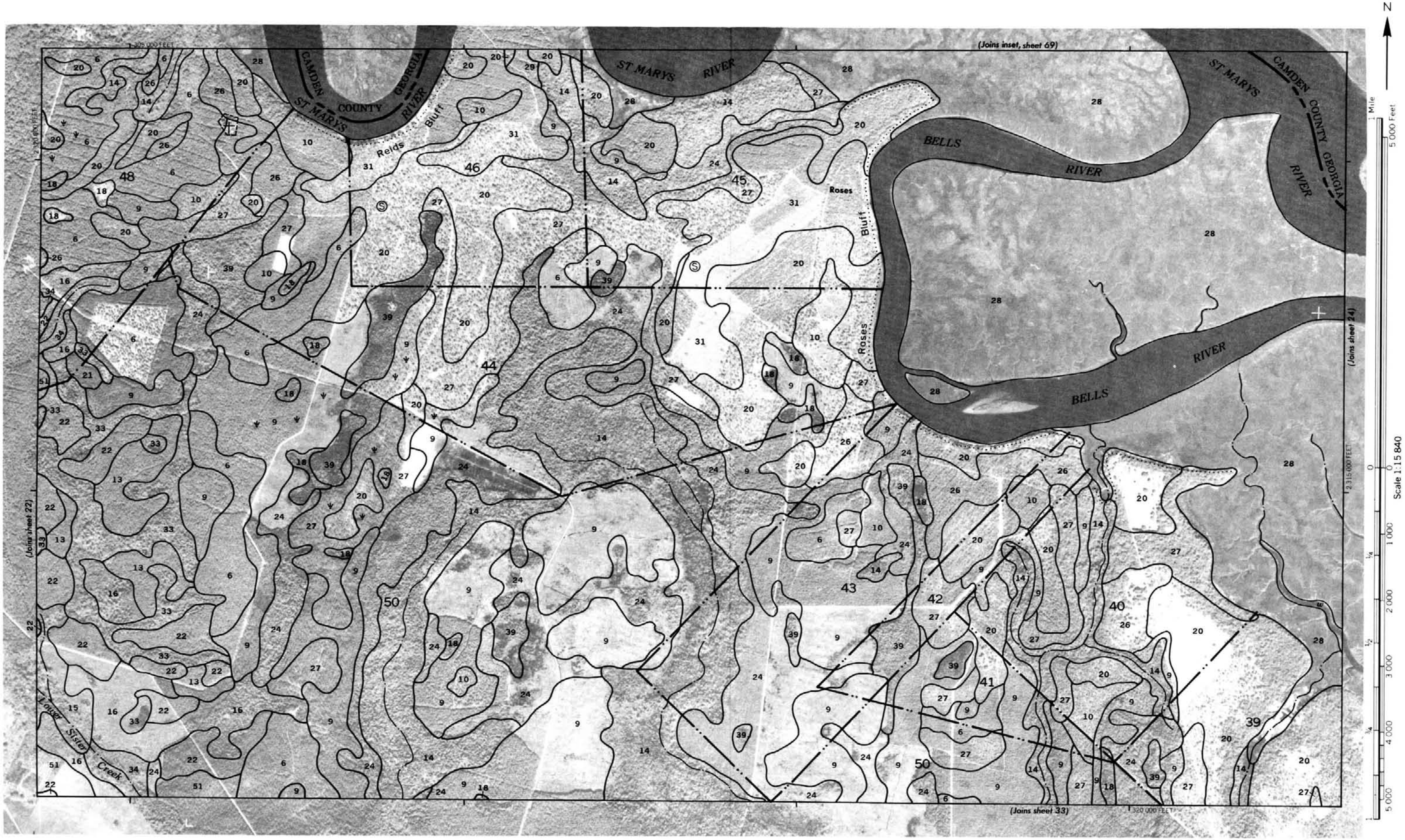

N
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
0
1 000
2 000
3 000
4 000
5 000
(Joins sheet 13)
(Joins sheet 19)
(Joins sheet 21)
(Joins sheet 30)
R. 25 E.
R. 26 E.
T. 4 N.
T. 3 N.
260 000 FEET
245 000 FEET
2 330 000 FEET
2 315 000 FEET
Wilder Swamp
Little St. Marys River
121A
108

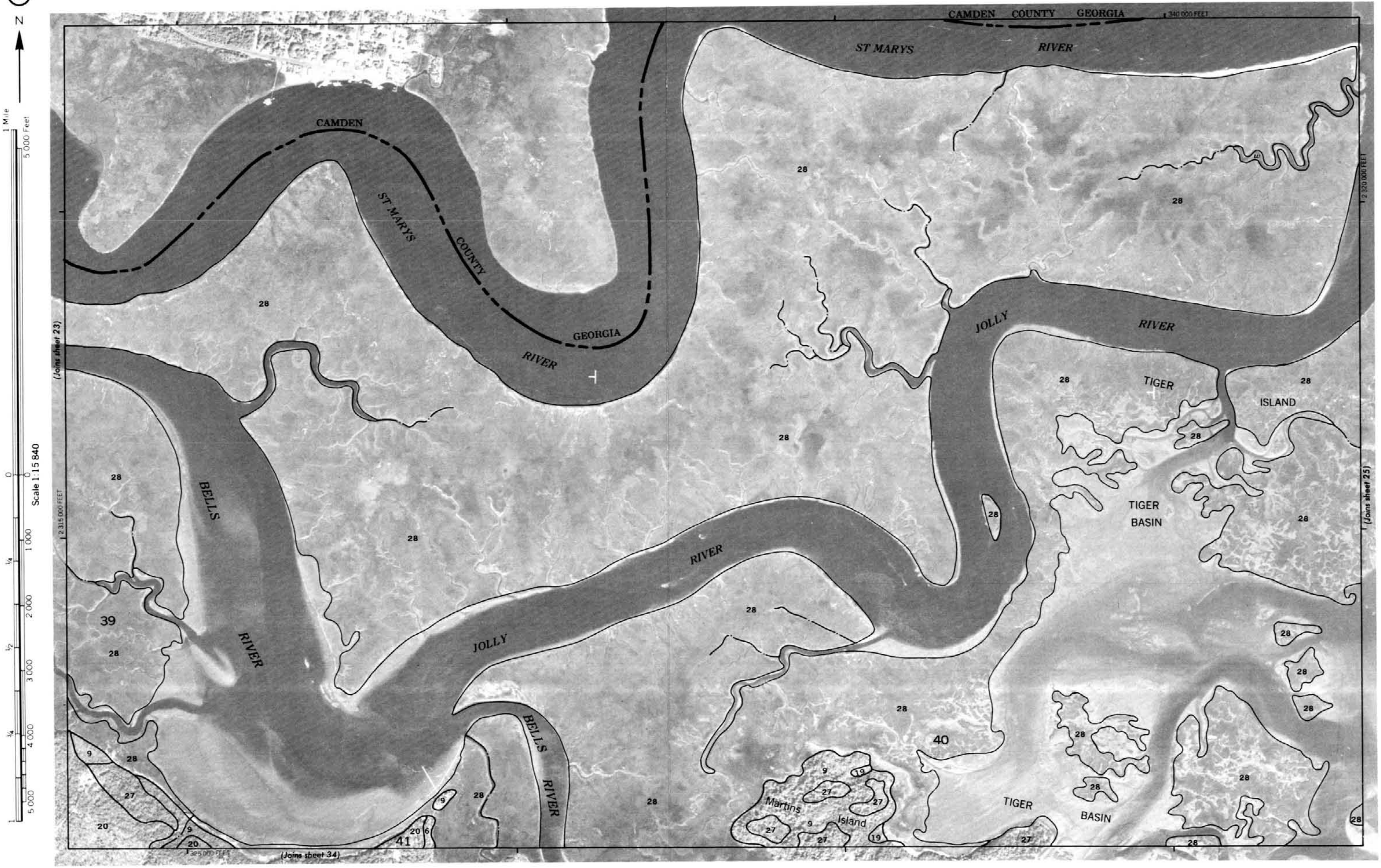

N
R 26 E.
(Joins sheet 14)
(Joins sheet 20)
(Joins sheet 22)
(Joins sheet 31)
T. 3 N. | T. 4 N.
265 000 FEET
280 000 FEET
2 330 000 FEET
2 315 000 FEET
Little St. Marys River
Wingate Landing
McQueen Swamp
Lofton Creek
Evergreen
108
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
1 000
2 000
3 000
4 000
5 000

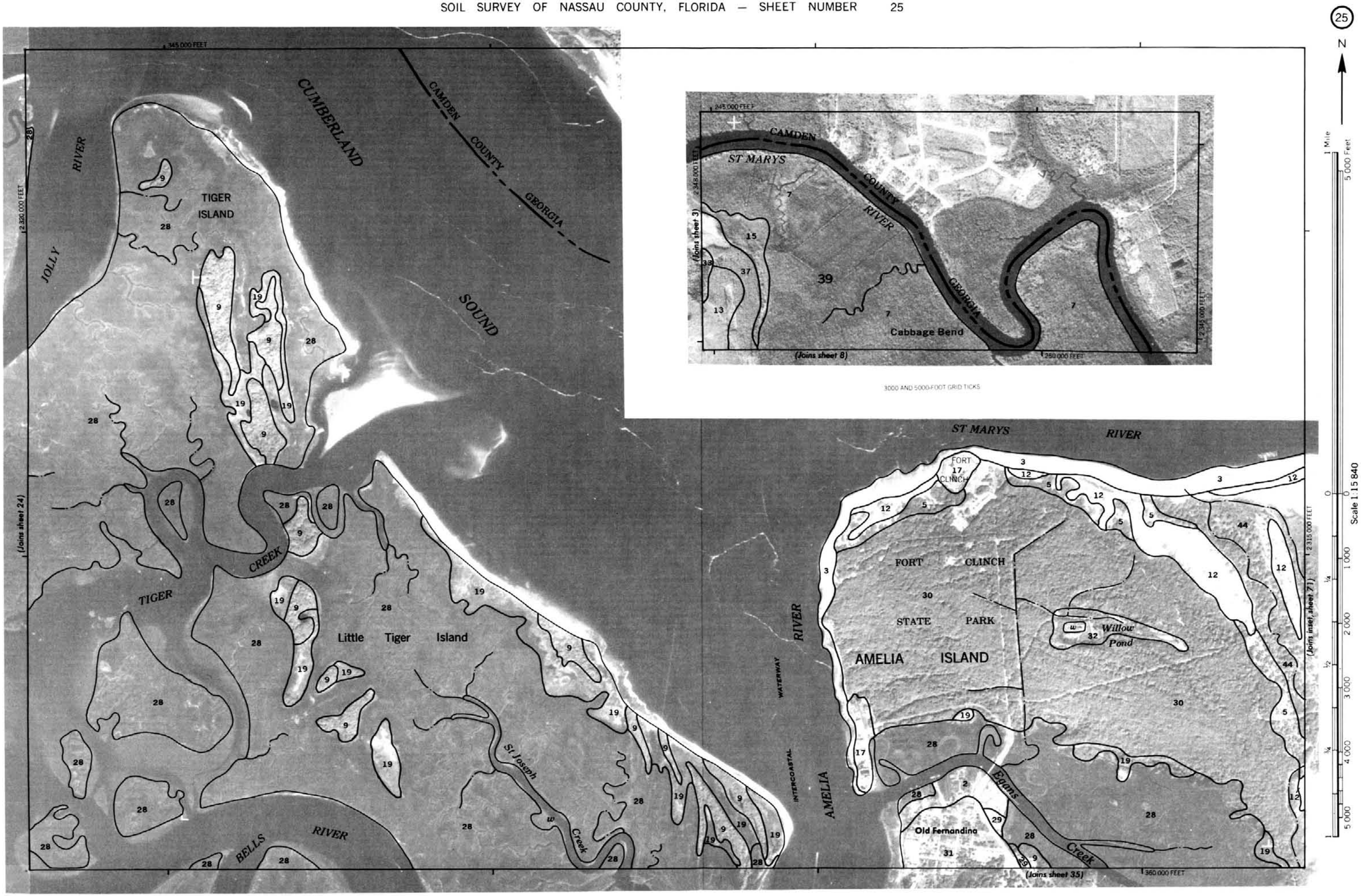

N
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
(Joins sheet 15)
(Joins sheet 21)
(Joins sheet 23)
(Joins sheet 32)
R. 26 E.
R. 27 E.
T. 3 N.
T. 4 N.
300 000 FEET
2 345 000 FEET
285 000 FEET
Upper
McQueen
Swamp
Sister Creek
Lofton Creek
Creek
SEABOARD
SYSTEM
water
w
17
95
108

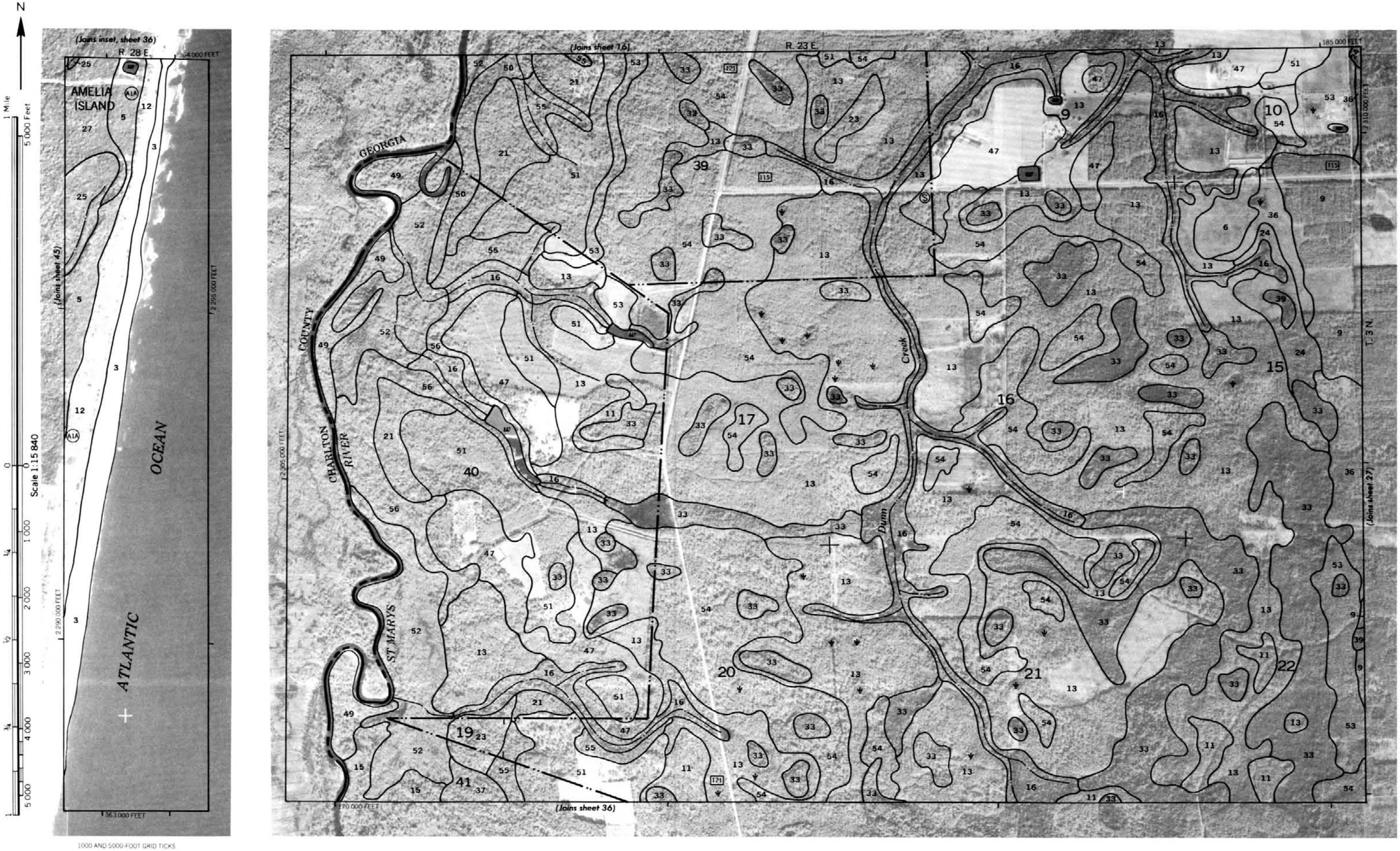
SOIL SURVEY OF NASSAU COUNTY, FLORIDA — SHEET NUMBER 23

㉓

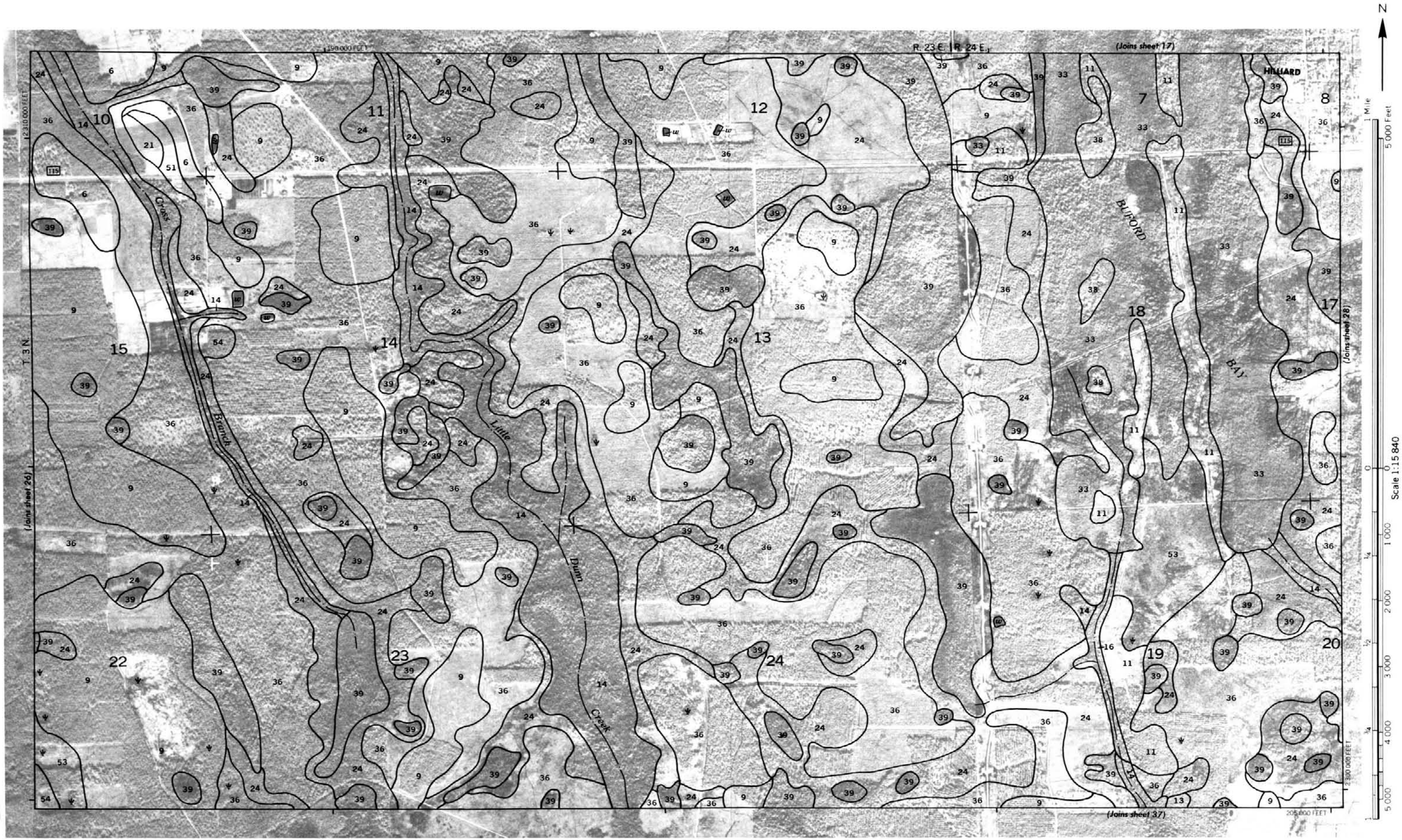

N
(Joins inset, sheet 69)
(Joins sheet 24)
(Joins sheet 33)
(Joins sheet 22)
305 000 FEET
2 320 000 FEET
2 315 000 FEET
320 000 FEET
CAMDEN COUNTY GEORGIA
ST MARYS RIVER
BELLS RIVER
Reids Bluff
Roses Bluff
Lower Sister Creek
1 Mile
5 000 Feet
Scale 1:15 840

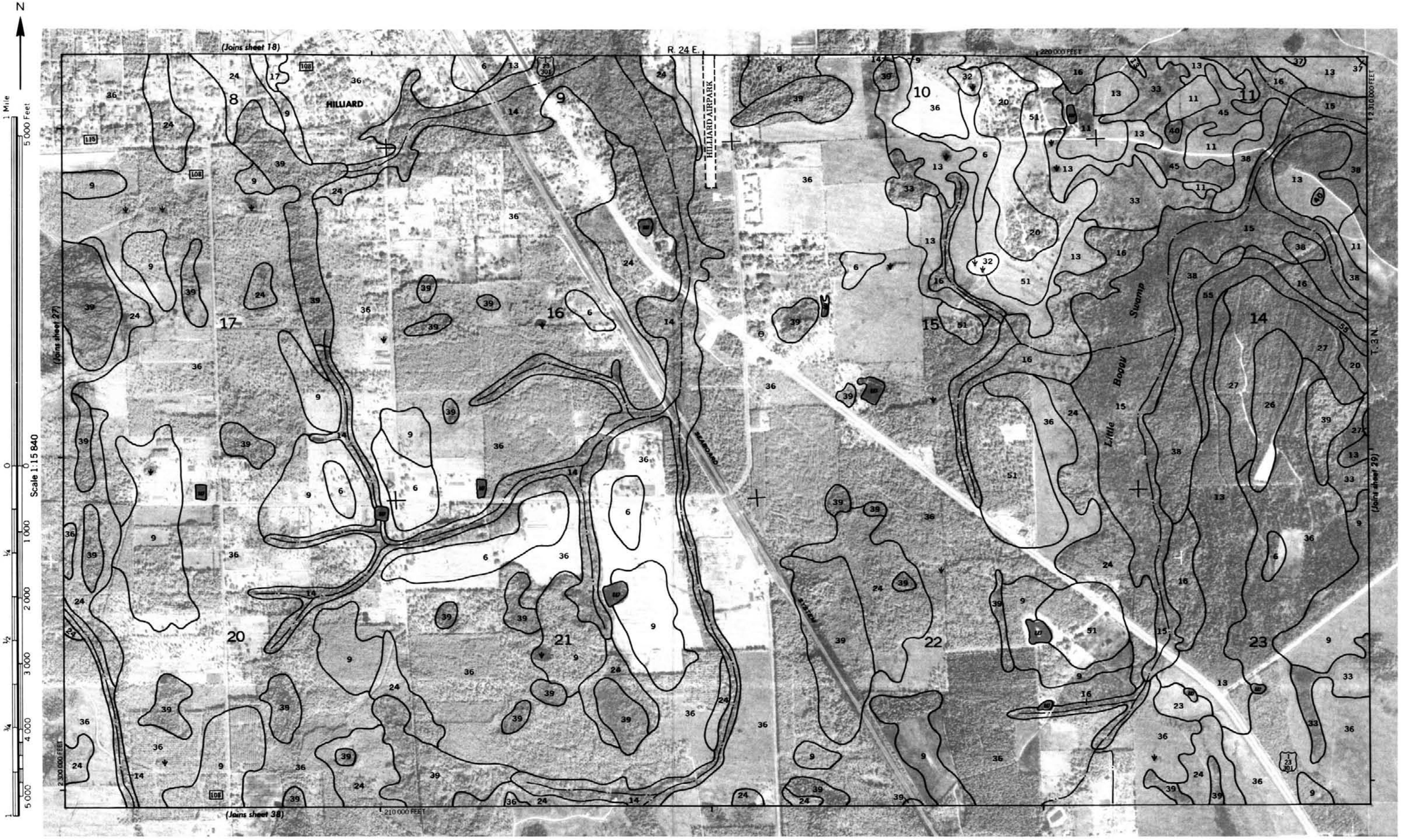

N
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
0
1 000
2 000
3 000
4 000
5 000
CAMDEN COUNTY GEORGIA
340 000 FEET
ST MARYS RIVER
CAMDEN
ST MARYS
COUNTY
GEORGIA
RIVER
2 320 000 FEET
(Joins sheet 23)
(Joins sheet 25)
2 315 000 FEET
JOLLY RIVER
BELLS RIVER
TIGER ISLAND
TIGER BASIN
Martins Island
28
39
40
41
9
19
20
27
6
325 000 FEET
(Joins sheet 34)

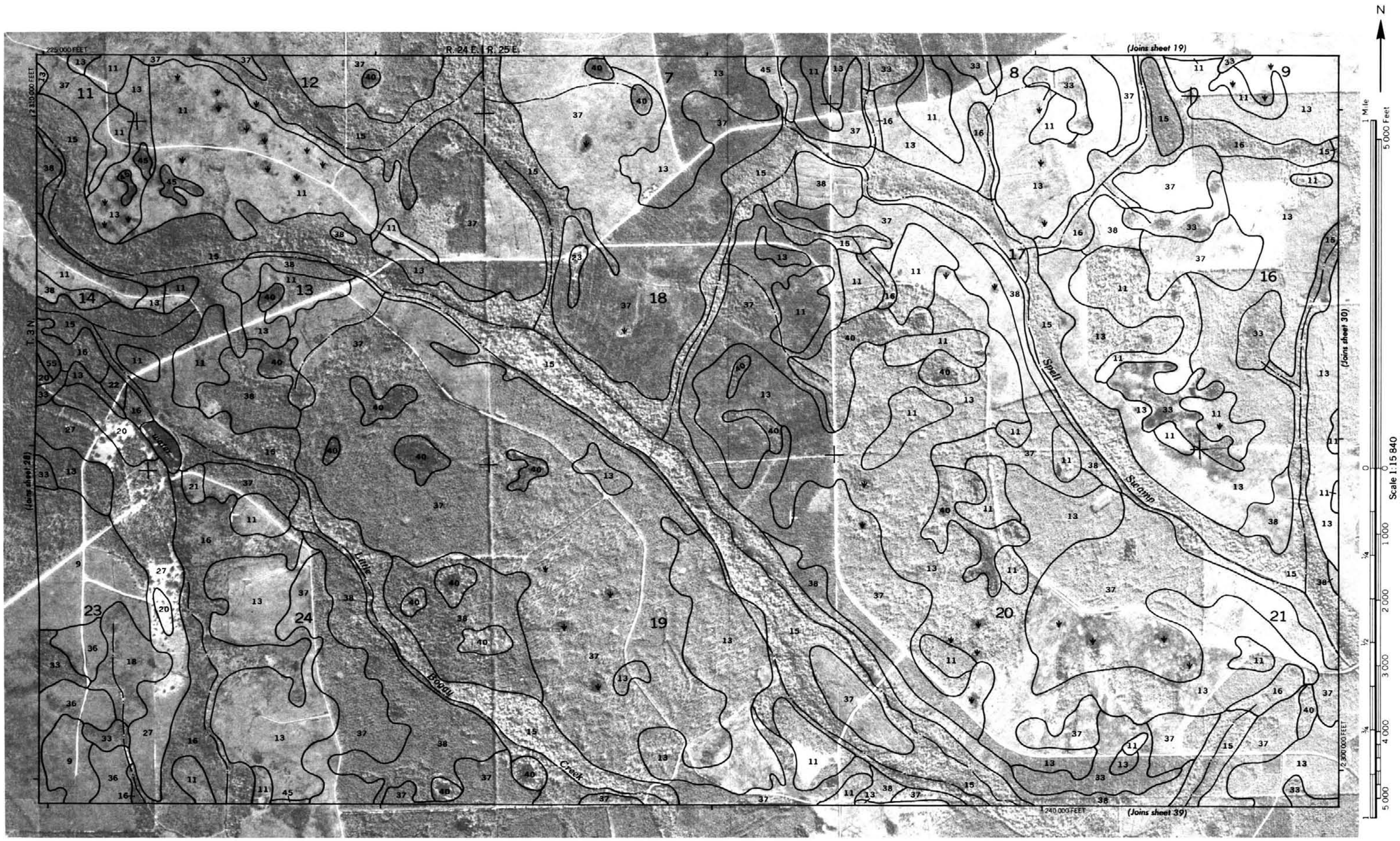

25
N
345 000 FEET
CUMBERLAND
SOUND
CAMDEN
COUNTY
GEORGIA
JOLLY
RIVER
TIGER
ISLAND
2 320 000 FEET
(Joins sheet 24)
TIGER
CREEK
Little Tiger Island
St Joseph
Creek
w
BELLS
RIVER
INTERCOASTAL
WATERWAY
AMELIA
RIVER
ST MARYS
RIVER
FORT
CLINCH
FORT CLINCH
STATE PARK
AMELIA ISLAND
Willow
Pond
w
Egans
Creek
Old Fernandina
(Joins sheet 35)
360 000 FEET
2 315 000 FEET
(Joins inset, sheet 71)
245 000 FEET
CAMDEN
COUNTY
GEORGIA
ST MARYS
RIVER
2 348 000 FEET
(Joins sheet 3)
Cabbage Bend
(Joins sheet 8)
250 000 FEET
2 345 000 FEET
3000 AND 5000-FOOT GRID TICKS
1 Mile
5 000 Feet
0
¼
½
¾
1
0
1 000
2 000
3 000
4 000
5 000
Scale 1:15 840
2
3
5
7
9
12
13
15
17
19
28
29
30
31
32
37
39
44

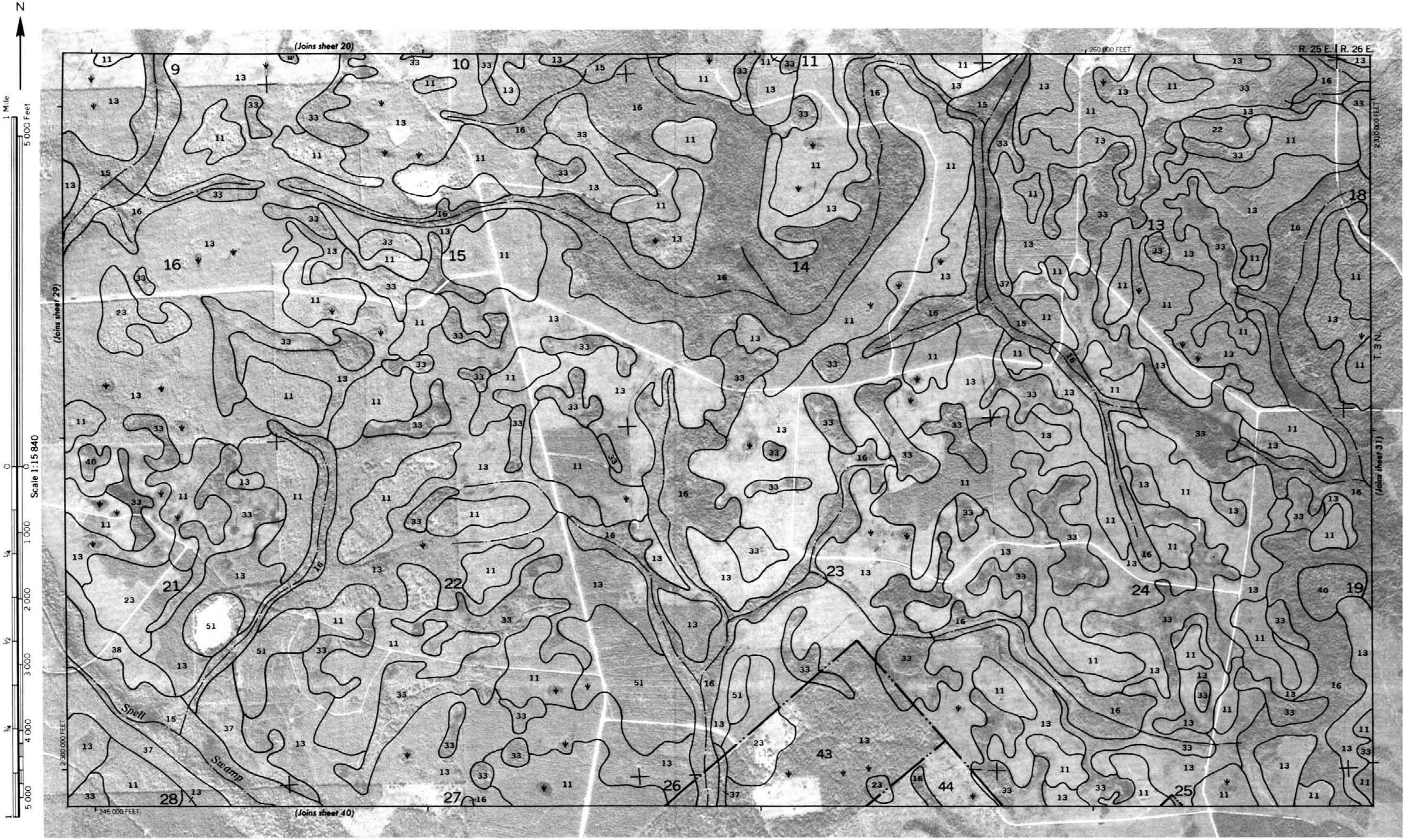

N
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
(Joins inset, sheet 36)
R. 28 E.
364 000 FEET
AMELIA ISLAND
A1A
(Joins sheet 45)
2 295 000 FEET
2 290 000 FEET
363 000 FEET
ATLANTIC
OCEAN
(Joins sheet 16)
R. 23 E.
185 000 FEET
2 310 000 FEET
2 305 000 FEET
170 000 FEET
T. 3 N.
(Joins sheet 27)
(Joins sheet 36)
GEORGIA
COUNTY
CHARLTON
RIVER
ST MARYS
Dunn
Creek
121
115
39
40
17
16
9
10
15
19
20
21
22
41
w

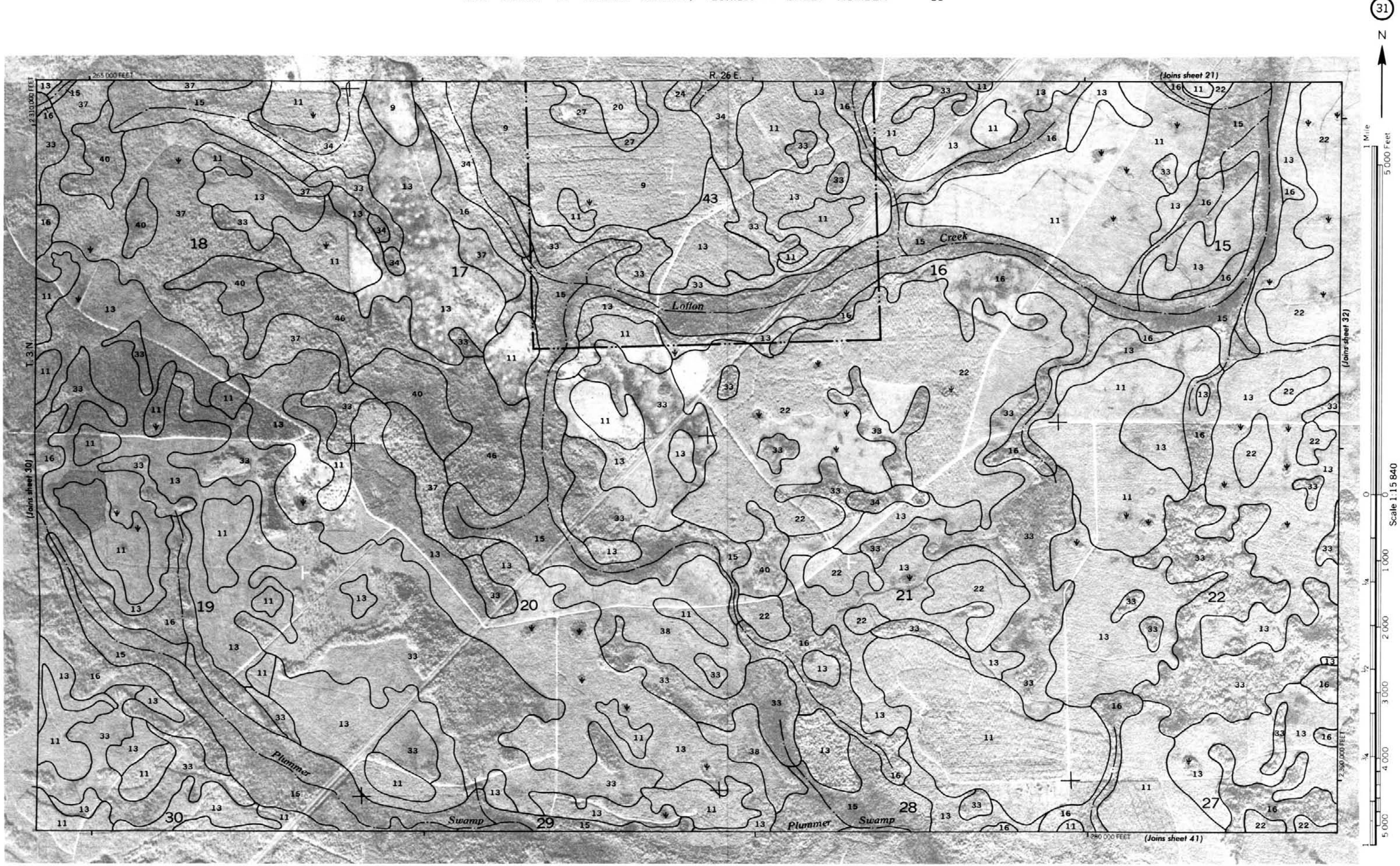
1000 AND 5000-FOOT GRID TICKS


N
(Joins sheet 17)
(Joins sheet 28)
(Joins sheet 37)
(Joins sheet 26)
R. 23 E. | R. 24 E.
T. 3 N.
HILLIARD
Cross Branch
Little Dunn Creek
BUFORD BAY
198 000 FEET
205 000 FEET
2 310 000 FEET
2 300 000 FEET
1 Mile
5 000 Feet
Scale 1:15 840
115

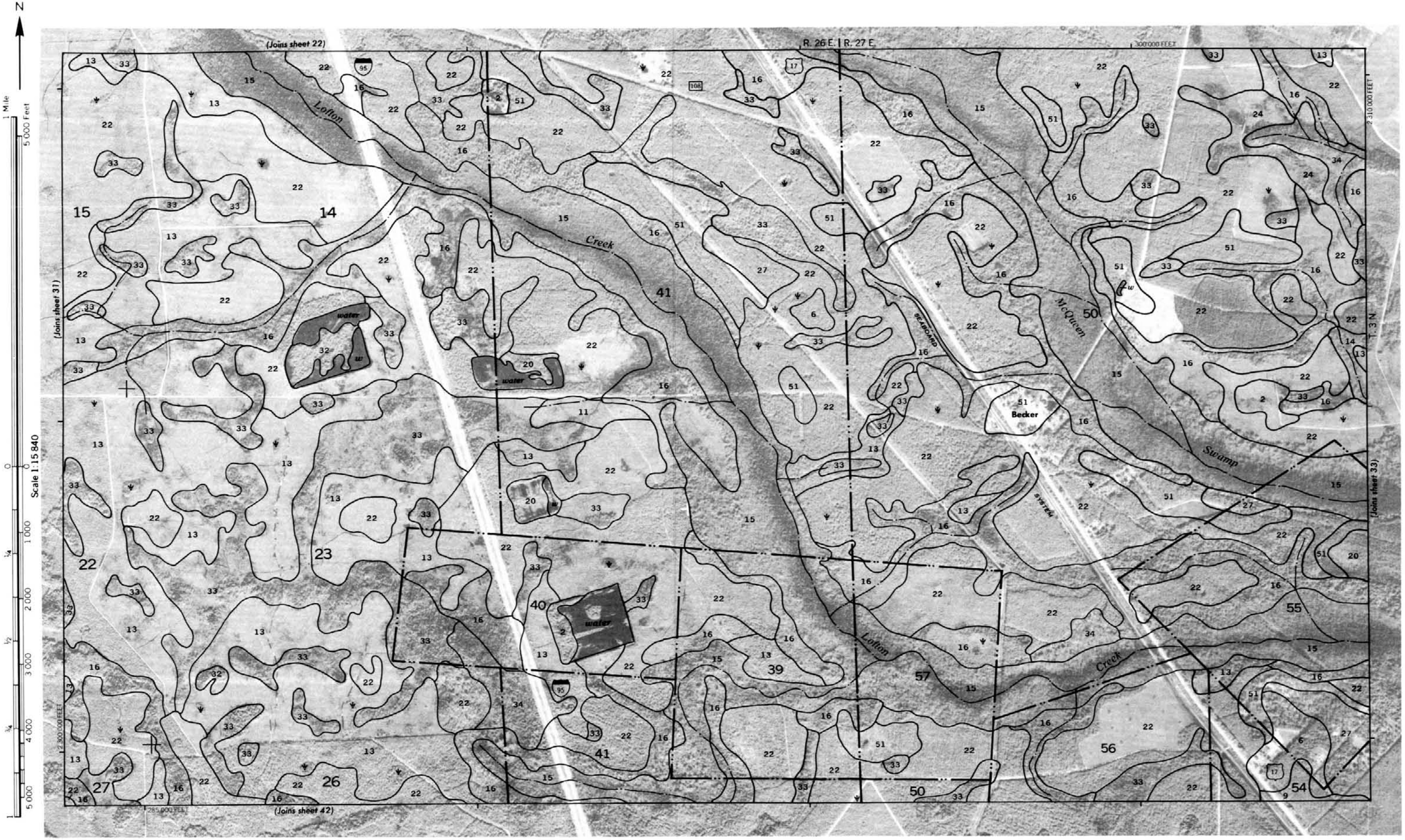

N
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
0
1 000
2 000
3 000
4 000
5 000
(Joins sheet 18)
(Joins sheet 27)
(Joins sheet 29)
(Joins sheet 38)
R. 24 E.
T. 3 N.
220 000 FEET
210 000 FEET
2 310 000 FEET
2 300 000 FEET
HILLIARD
HILLIARD AIRPARK
SEABOARD
SYSTEM
Little Bogey Swamp
108
115
23
301
8
9
10
11
14
15
16
17
20
21
22
23

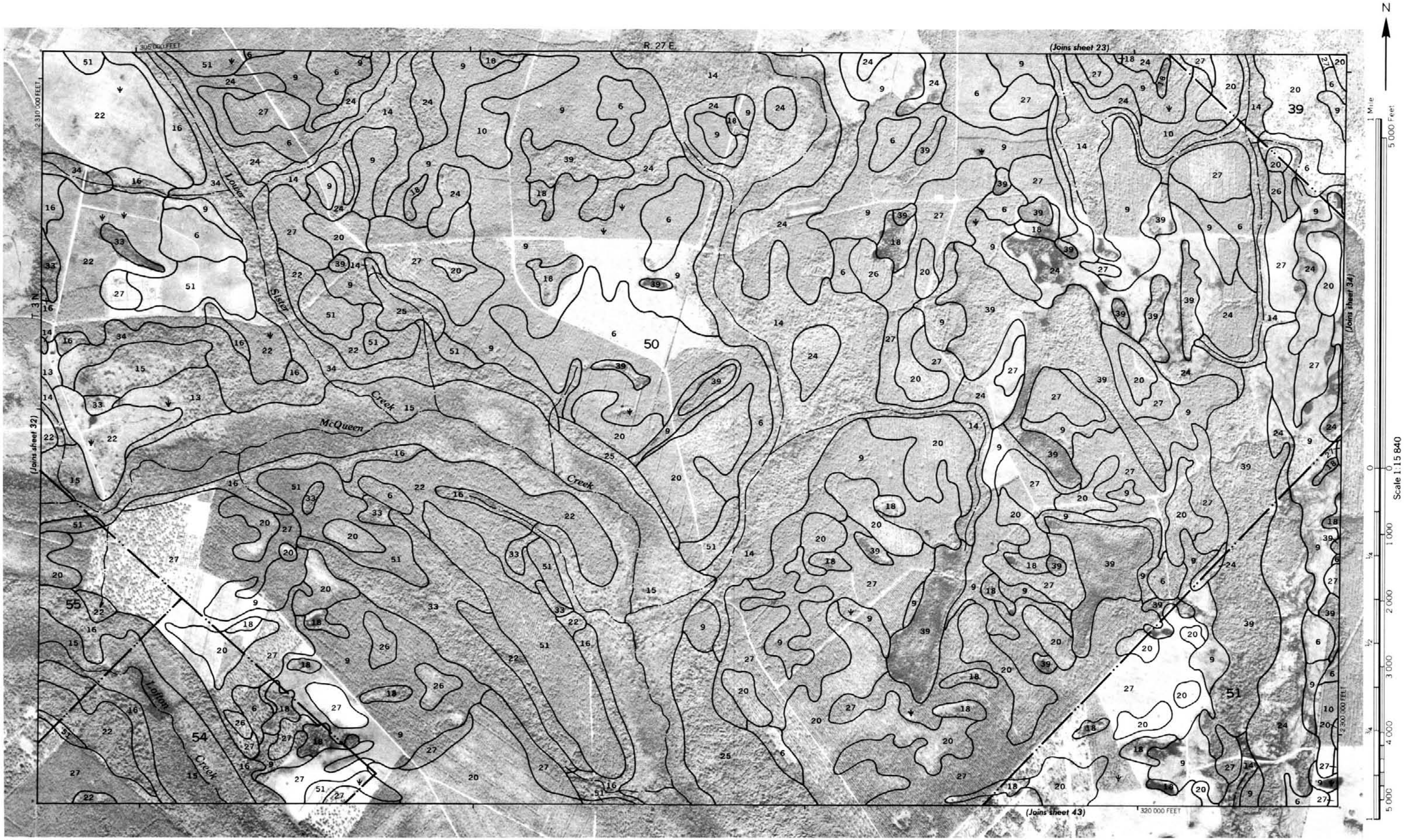

N
(Joins sheet 19)
(Joins sheet 30)
(Joins sheet 39)
(Joins sheet 28)
225 000 FEET
2 310 000 FEET
240 000 FEET
2 300 000 FEET
R. 24 E. | R. 25 E.
T. 3 N.
Little Bogay Creek
Spell Swamp
7
8
9
11
12
13
14
16
17
18
19
20
21
23
24
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
1 000
2 000
3 000
4 000
5 000

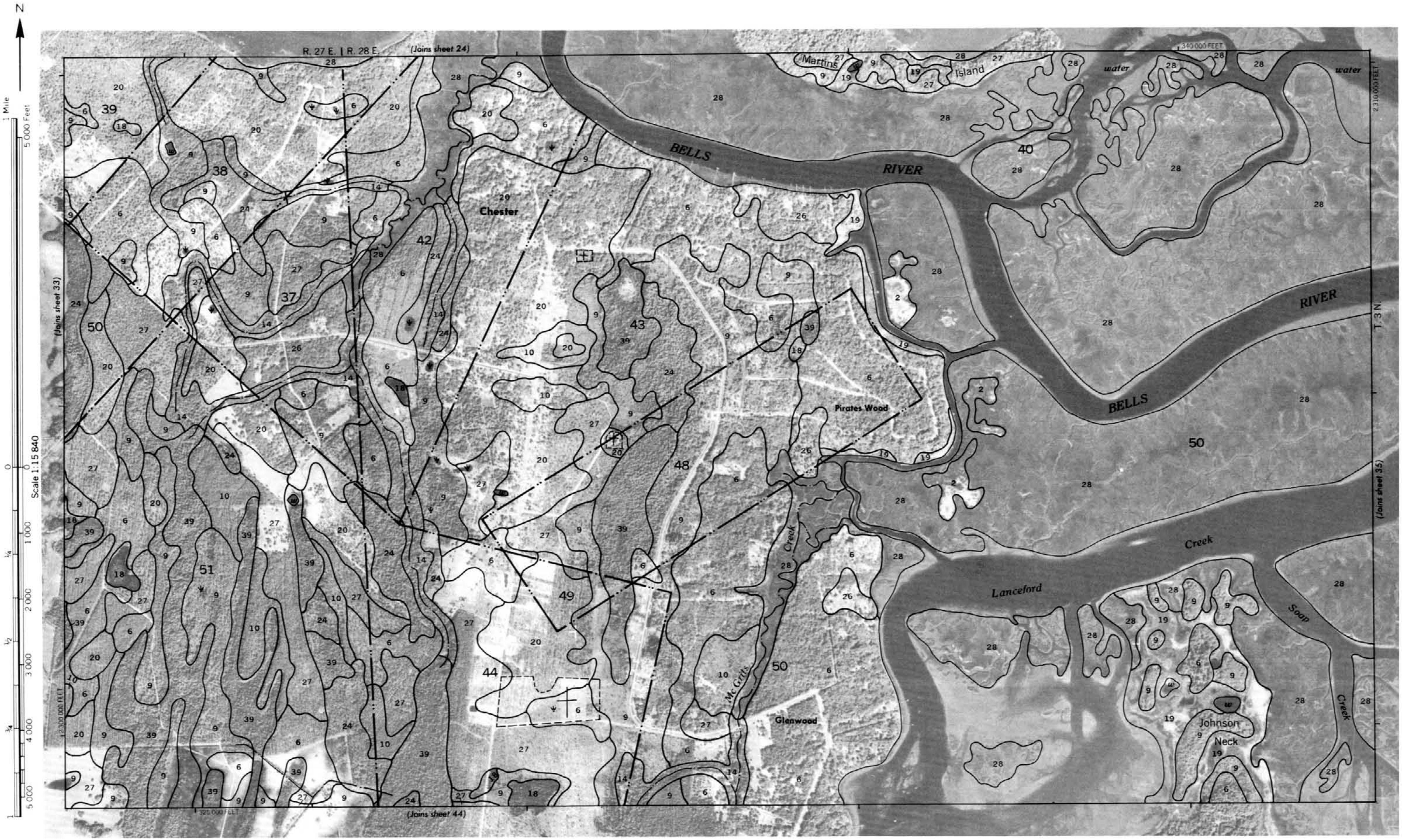

N
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1 000
2 000
3 000
4 000
5 000
(Joins sheet 20)
(Joins sheet 29)
(Joins sheet 31)
(Joins sheet 40)
260 000 FEET
R. 25 E.
R. 26 E.
2 310 000 FEET
T. 3 N.
2 300 000 FEET
245 000 FEET
Spell Swamp
9
10
11
13
14
15
18
19
21
22
23
24
25
26
27
28

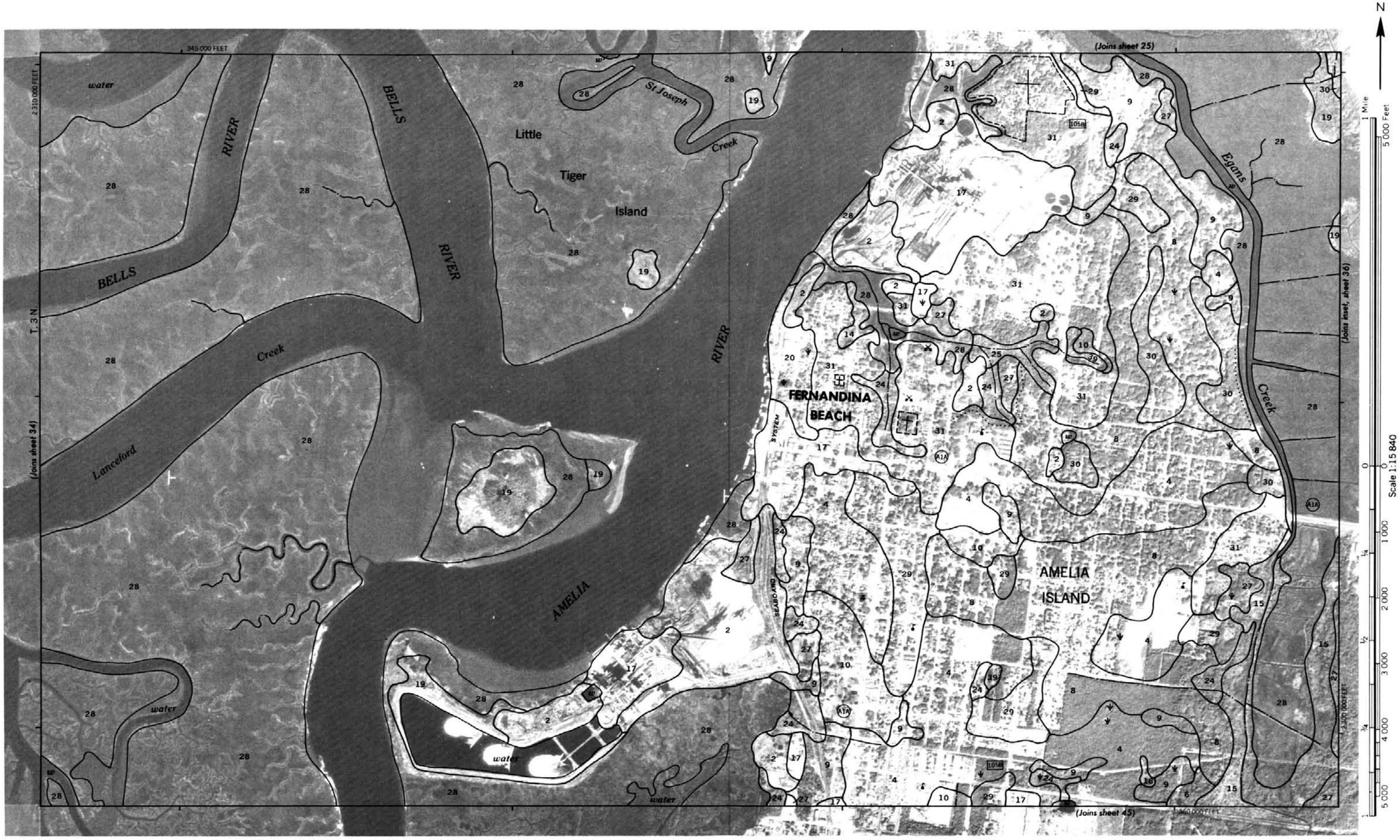

(31)
N
265 000 FEET
2 310 000 FEET
R. 26 E.
T. 3 N.
(Joins sheet 21)
(Joins sheet 30)
(Joins sheet 32)
(Joins sheet 41)
280 000 FEET
2 300 000 FEET
Lofton
Creek
Plummer
Swamp
Plummer Swamp
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1 000
2 000
3 000
4 000
5 000
17
18
19
20
21
22
15
16
27
28
29
30
43

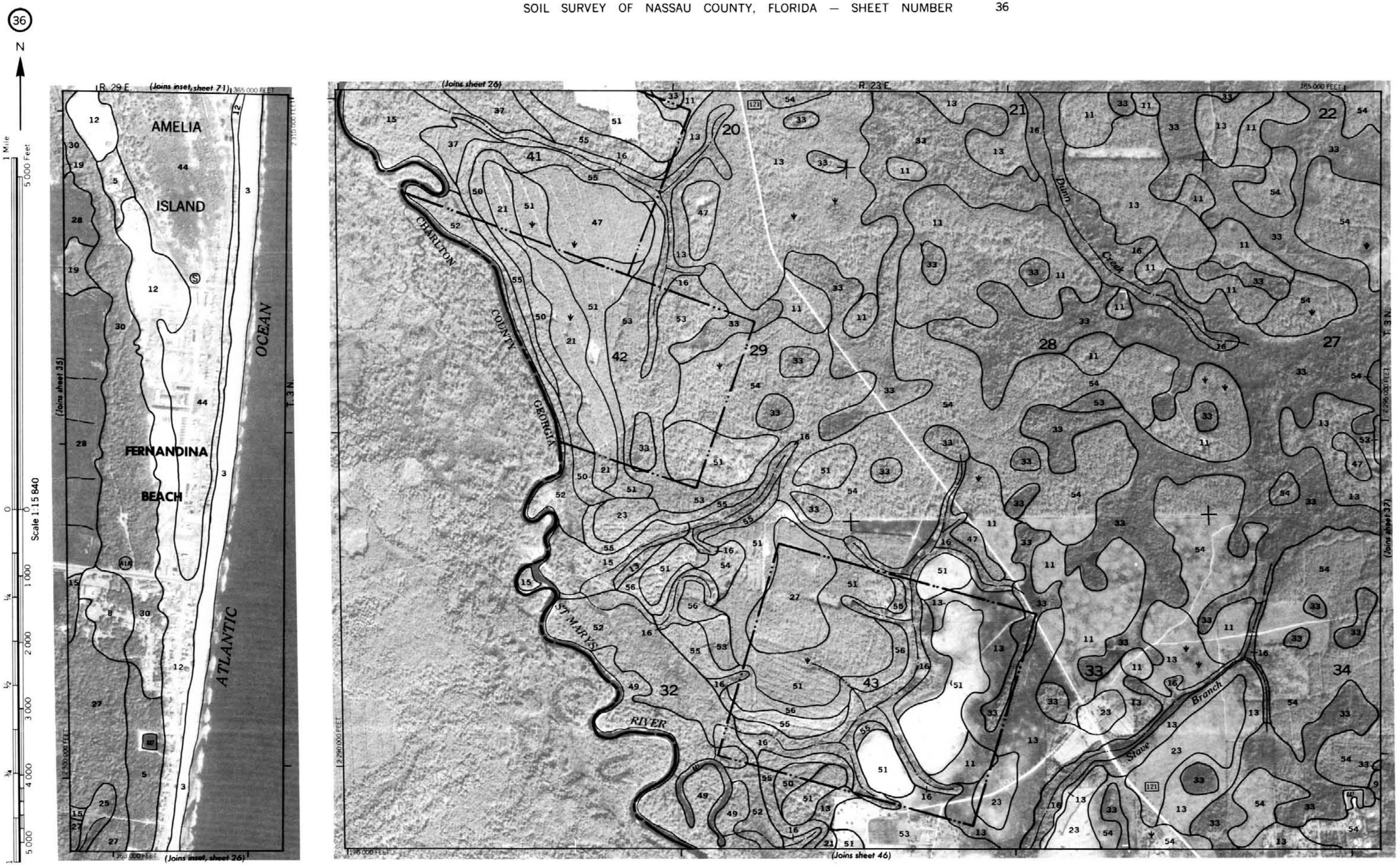
SOIL SURVEY OF NASSAU COUNTY, FLORIDA — SHEET NUMBER 32


N
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
¼
2 000
½
3 000
¾
4 000
5 000
(Joins sheet 22)
(Joins sheet 31)
(Joins sheet 33)
(Joins sheet 42)
R. 26 E.
R. 27 E.
T. 3 N.
300 000 FEET
2 310 000 FEET
285 000 FEET
2 300 000 FEET
95
17
108
Lofton Creek
McQueen Swamp
Seaboard System
Becker
water
w

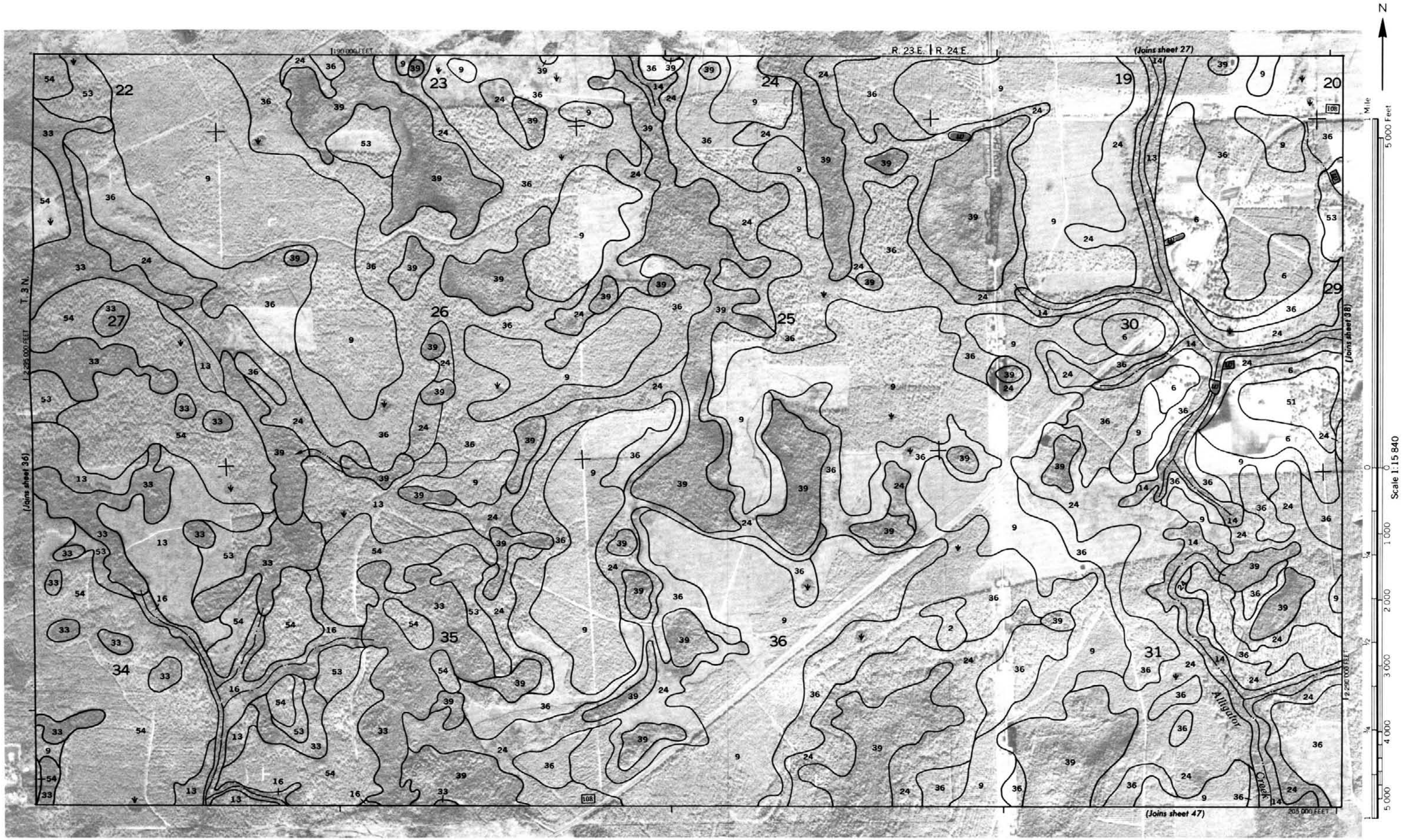

N
R. 27 E.
T. 3 N.
305 000 FEET
2 310 000 FEET
320 000 FEET
2 300 000 FEET
(Joins sheet 23)
(Joins sheet 34)
(Joins sheet 43)
(Joins sheet 32)
Lower Sister Creek
McQueen Creek
Lofton Creek
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1 000
2 000
3 000
4 000
5 000


N
1 Mile
5 000 Feet
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
1
Scale 1:15 840
R. 27 E.
R. 28 E.
(Joins sheet 24)
(Joins sheet 33)
(Joins sheet 35)
(Joins sheet 44)
T. 3 N.
340 000 FEET
2 310 000 FEET
2 300 000 FEET
325 000 FEET
Martins Island
water
water
BELLS RIVER
BELLS RIVER
Chester
Pirates Wood
McGirts Creek
Glenwood
Lanceford Creek
Soap Creek
Johnson Neck
w
w
50
51
42
43
48
49
44
37
38
39
40
50

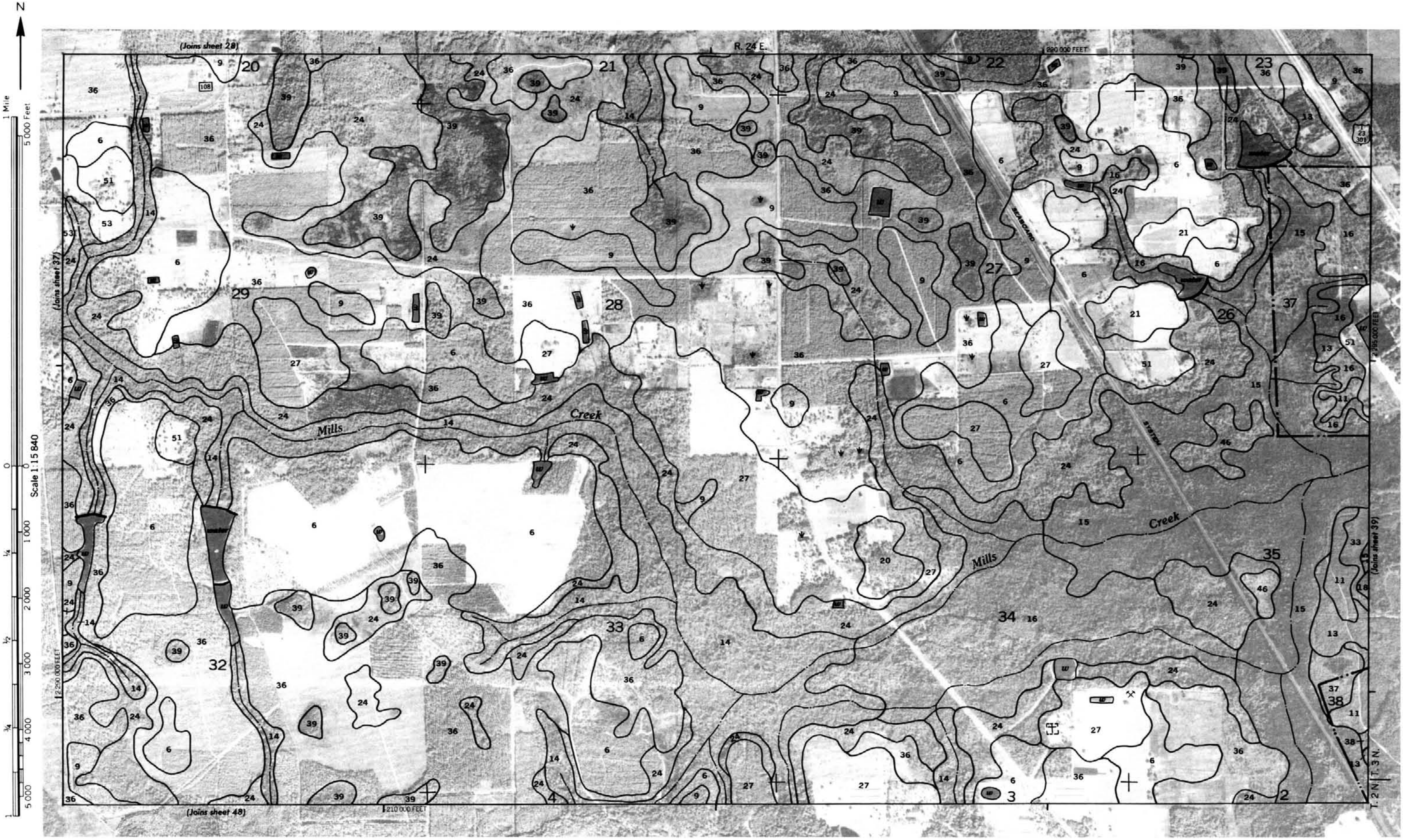

N
(Joins sheet 25)
(Joins sheet 34)
(Joins sheet 45)
(Joins inset, sheet 36)
345 000 FEET
360 000 FEET
2 310 000 FEET
2 300 000 FEET
T. 3 N.
BELLS RIVER
Little Tiger Island
St Joseph Creek
Lanceford Creek
AMELIA RIVER
Egans Creek
FERNANDINA BEACH
AMELIA ISLAND
SEABOARD SYSTEM
water
w
A1A
105B
1 Mile
5 000 Feet
0
1/4
1/2
3/4
1 000
2 000
3 000
4 000
5 000
Scale 1:15 840
2
4
6
8
9
10
14
15
17
18
19
20
24
25
27
28
29
30
31
39

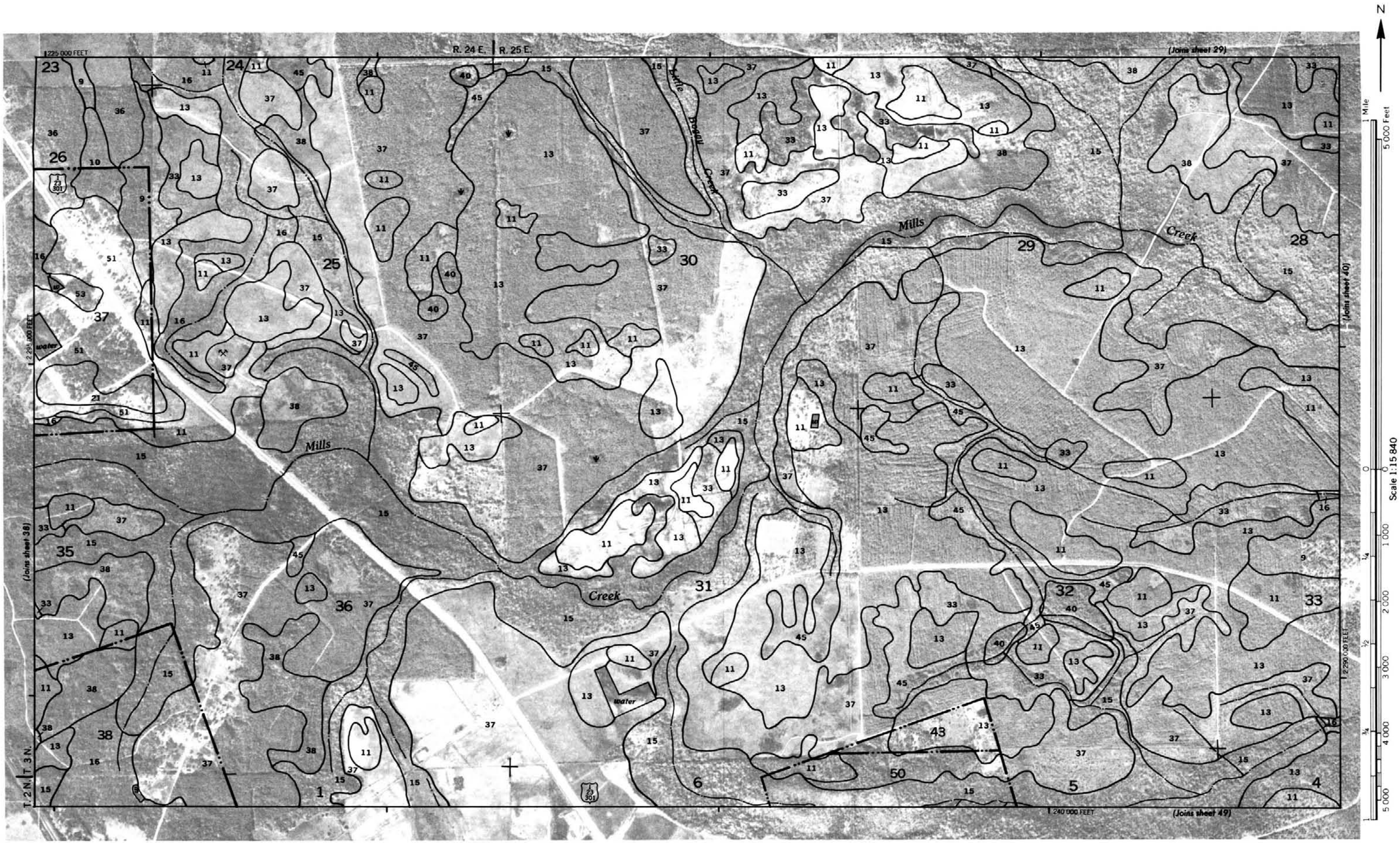

36
N
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1 000
2 000
3 000
4 000
5 000
R. 29 E.
(Joins inset, sheet 71)
365 000 FEET
2 310 000 FEET
AMELIA
ISLAND
FERNANDINA
BEACH
ATLANTIC
OCEAN
T. 3 N.
(Joins sheet 35)
2 300 000 FEET
363 000 FEET
(Joins inset, sheet 26)
(Joins sheet 26)
R. 23 E.
185 000 FEET
121
CHARLTON
COUNTY
GEORGIA
ST MARYS
RIVER
Dunn
Creek
Slave
Branch
T. 3 N.
2 295 000 FEET
(Joins sheet 37)
2 290 000 FEET
170 000 FEET
(Joins sheet 46)

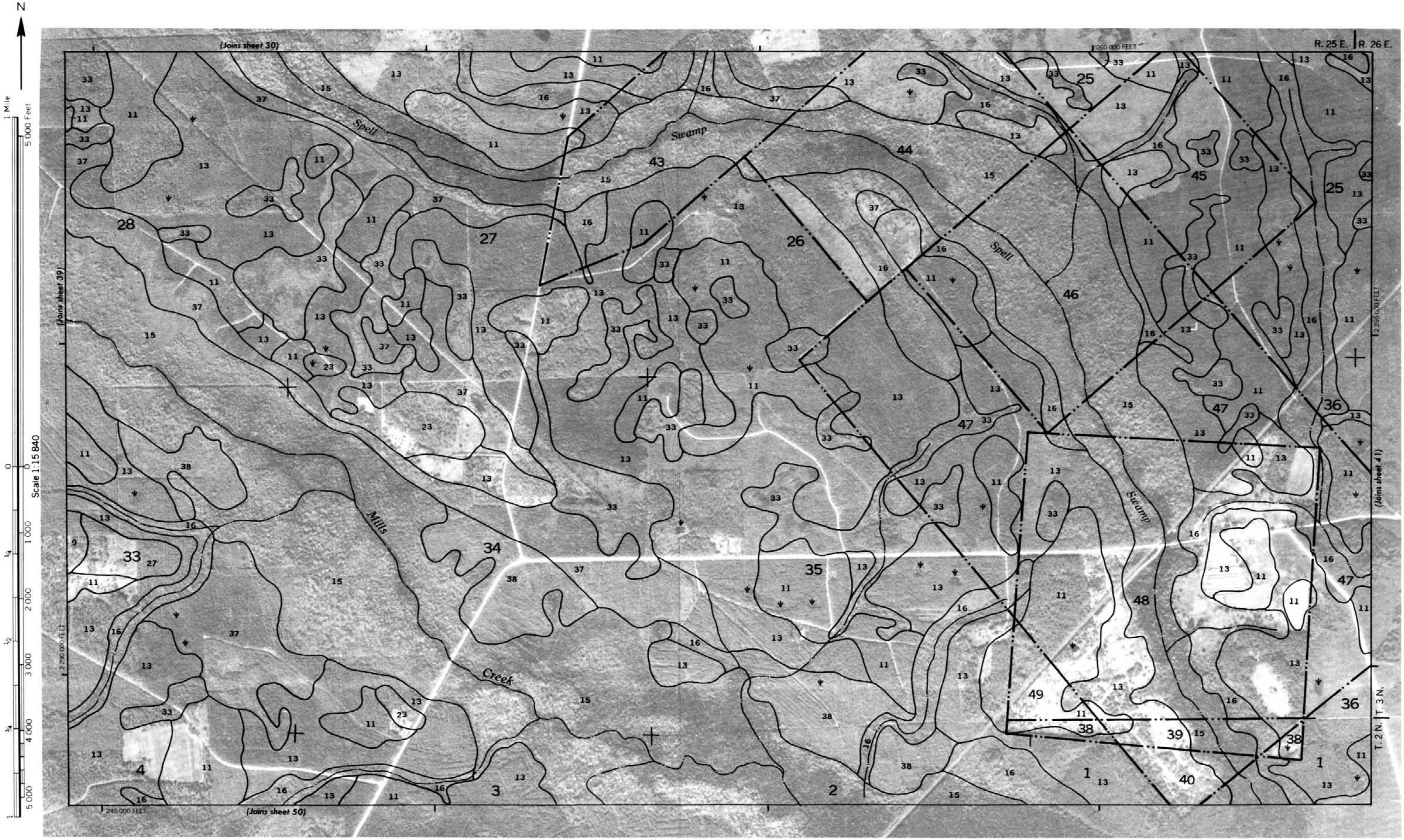
2000 AND 5000-FOOT GRID TICKS

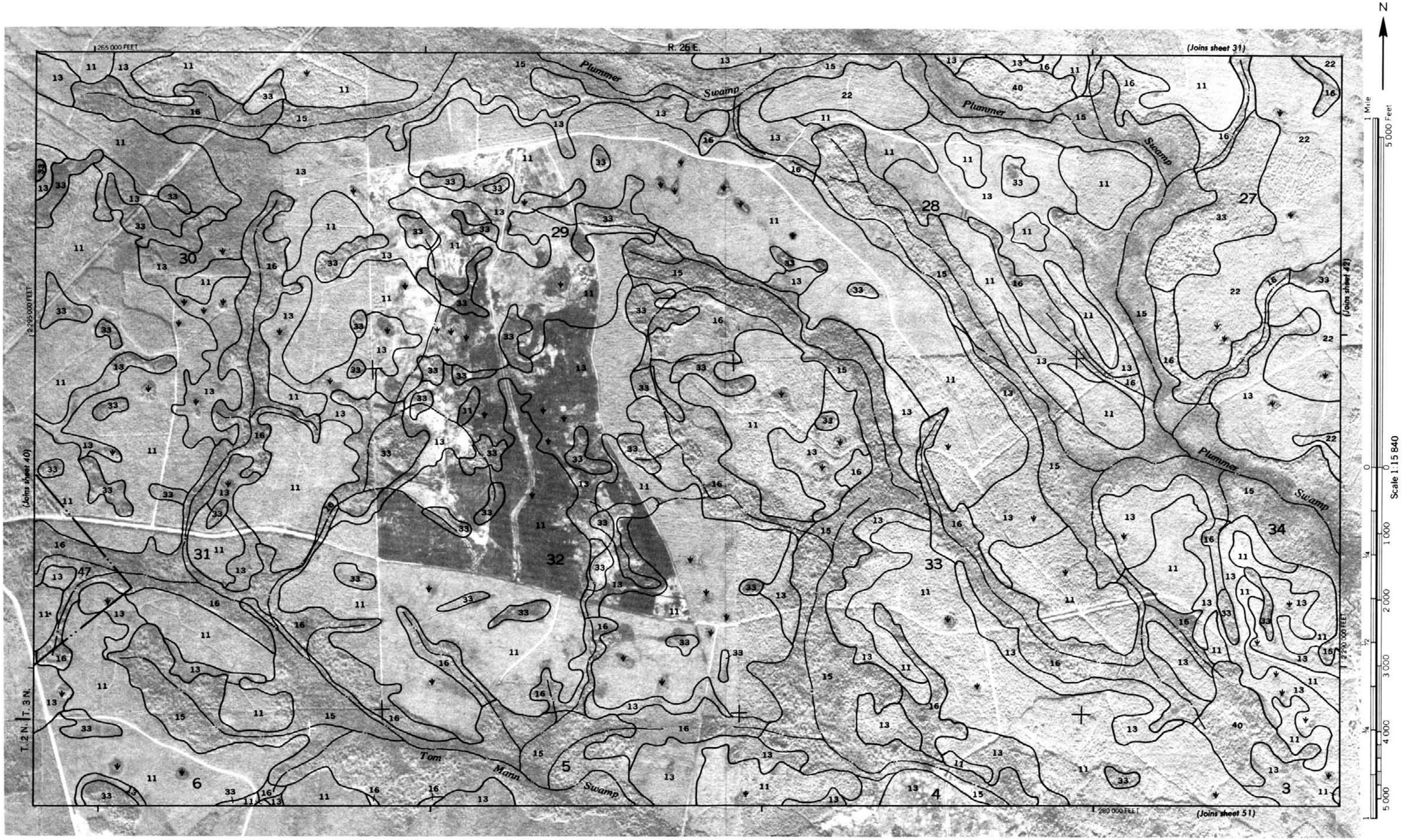

N
190 000 FEET
R. 23 E. | R. 24 E.
(Joins sheet 27)
T. 3 N.
2 295 000 FEET
(Joins sheet 36)
(Joins sheet 38)
(Joins sheet 47)
2 290 000 FEET
205 000 FEET
22
23
24
19
20
27
26
25
30
29
34
35
36
31
Alligator Creek
108
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾

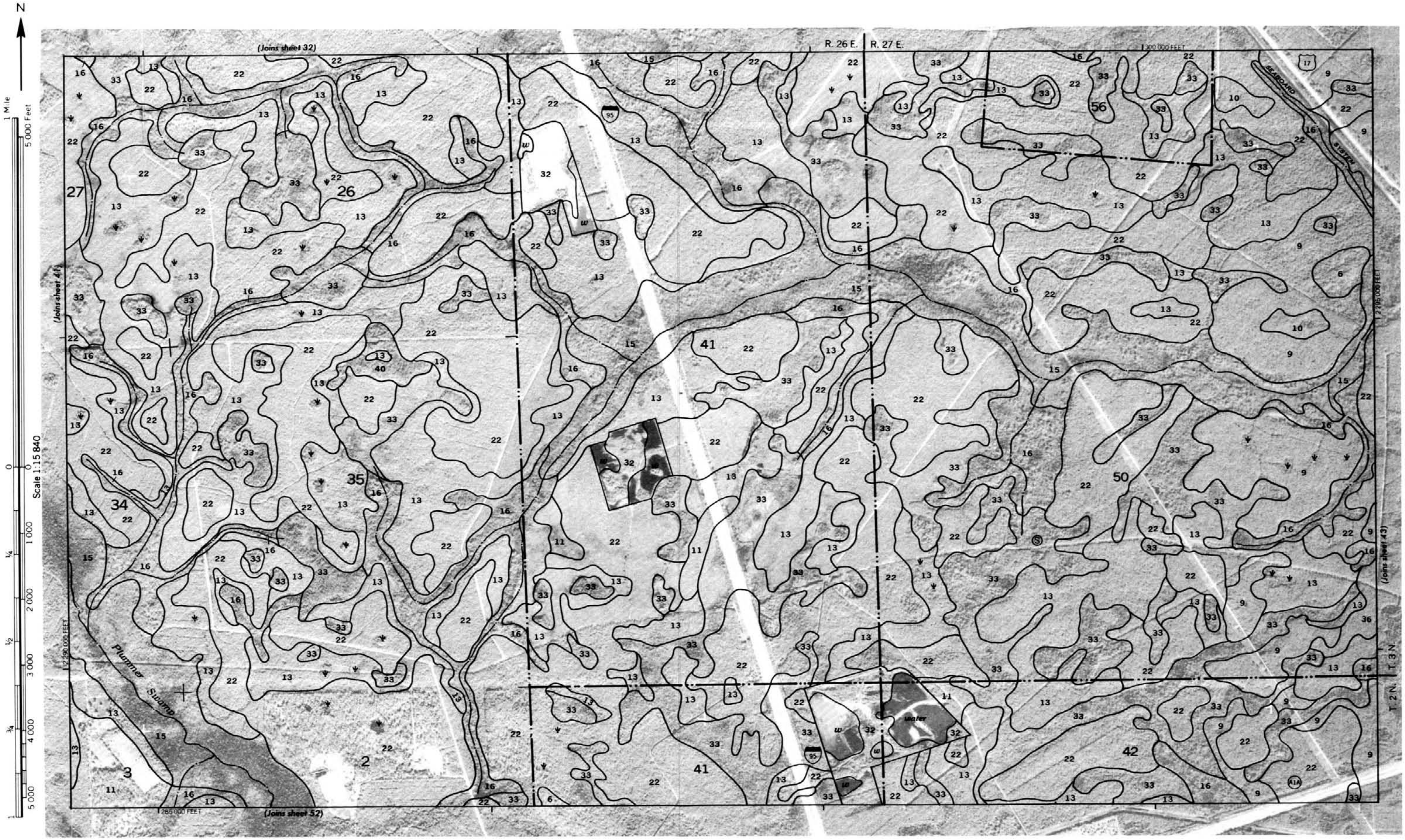
SOIL SURVEY OF NASSAU COUNTY, FLORIDA — SHEET NUMBER 38

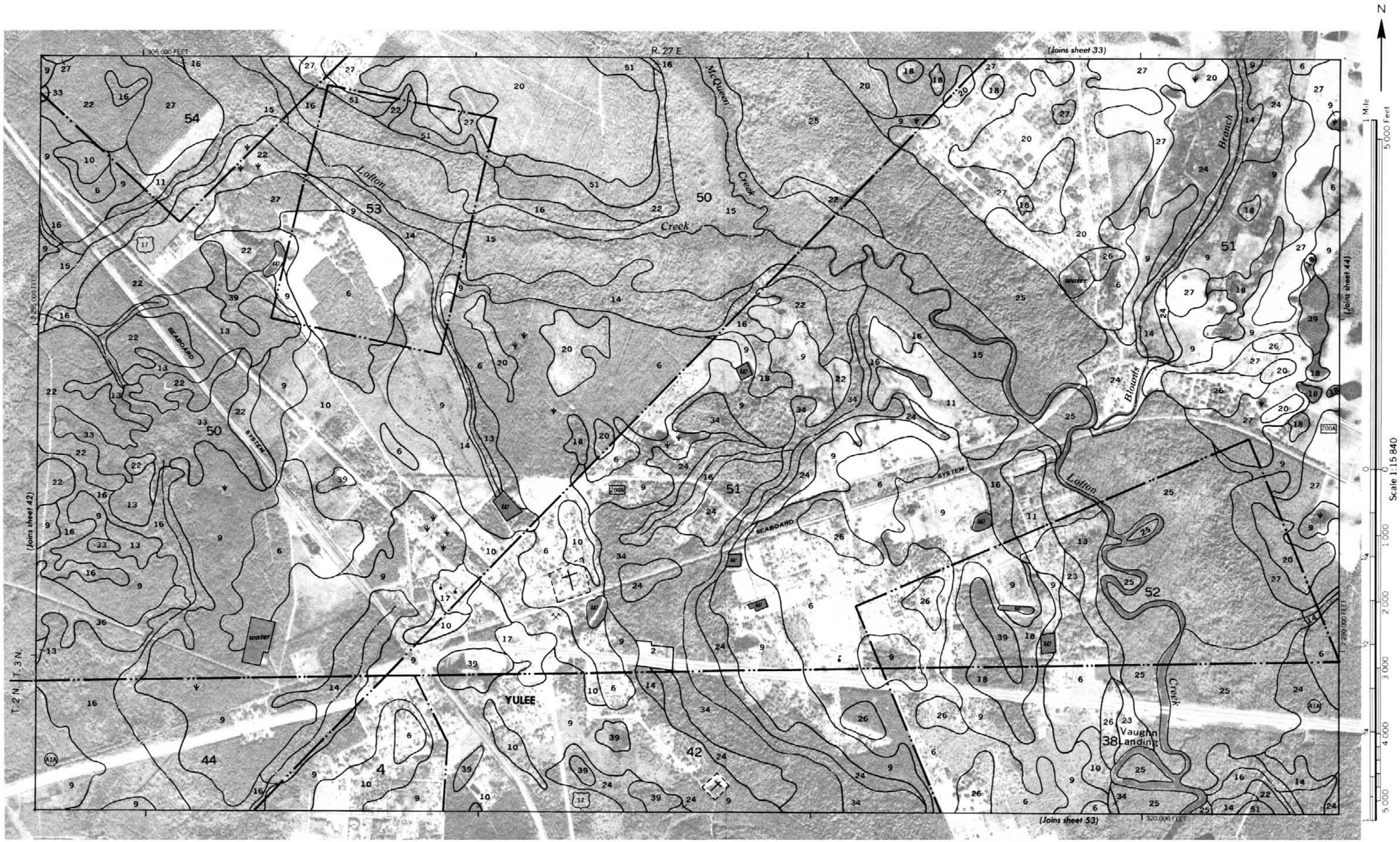

N
(Joins sheet 28)
R. 24 E.
290 000 FEET
(Joins sheet 37)
(Joins sheet 39)
(Joins sheet 48)
210 000 FEET
2 200 000 FEET
2 195 000 FEET
T. 2 N. | T. 3 N.
Mills Creek
Mills Creek
SEABOARD
SYSTEM
108
23
301
water
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
¼
2 000
½
3 000
¾
4 000
5 000
20
21
22
23
29
28
27
26
37
32
33
34
35
38
4
3
2

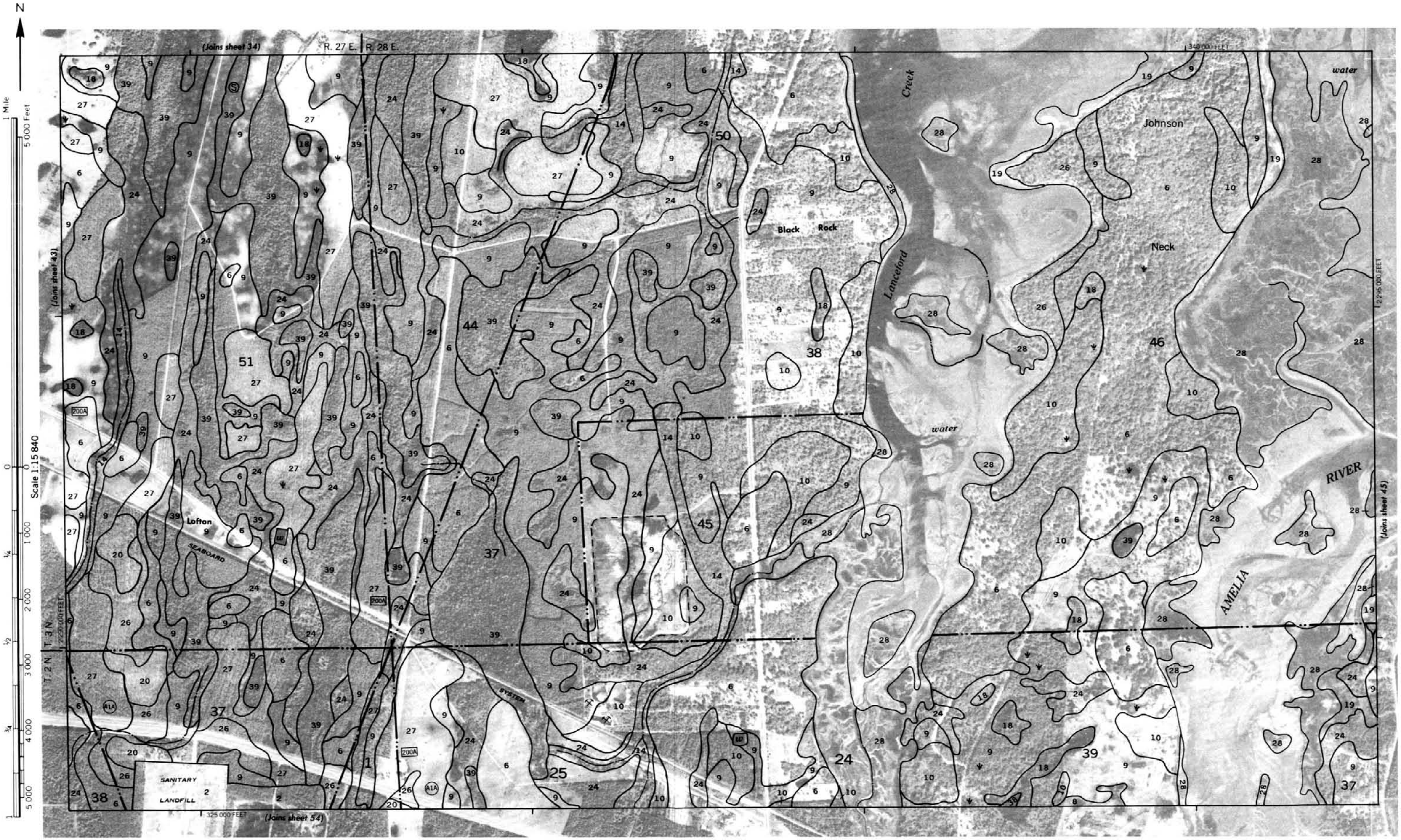

N
R. 24 E.
R. 25 E.
225 000 FEET
240 000 FEET
2 295 000 FEET
2 290 000 FEET
(Joins sheet 29)
(Joins sheet 40)
(Joins sheet 49)
(Joins sheet 38)
T. 2 N.
T. 3 N.
Little Boggy Creek
Mills Creek
Mills
Creek
water
23
24
25
26
28
29
30
31
32
33
35
36
1
4
5
6
23
301
1 Mile
5 000 Feet
0
¼
½
¾
1 000
2 000
3 000
4 000
5 000
Scale 1:15 840

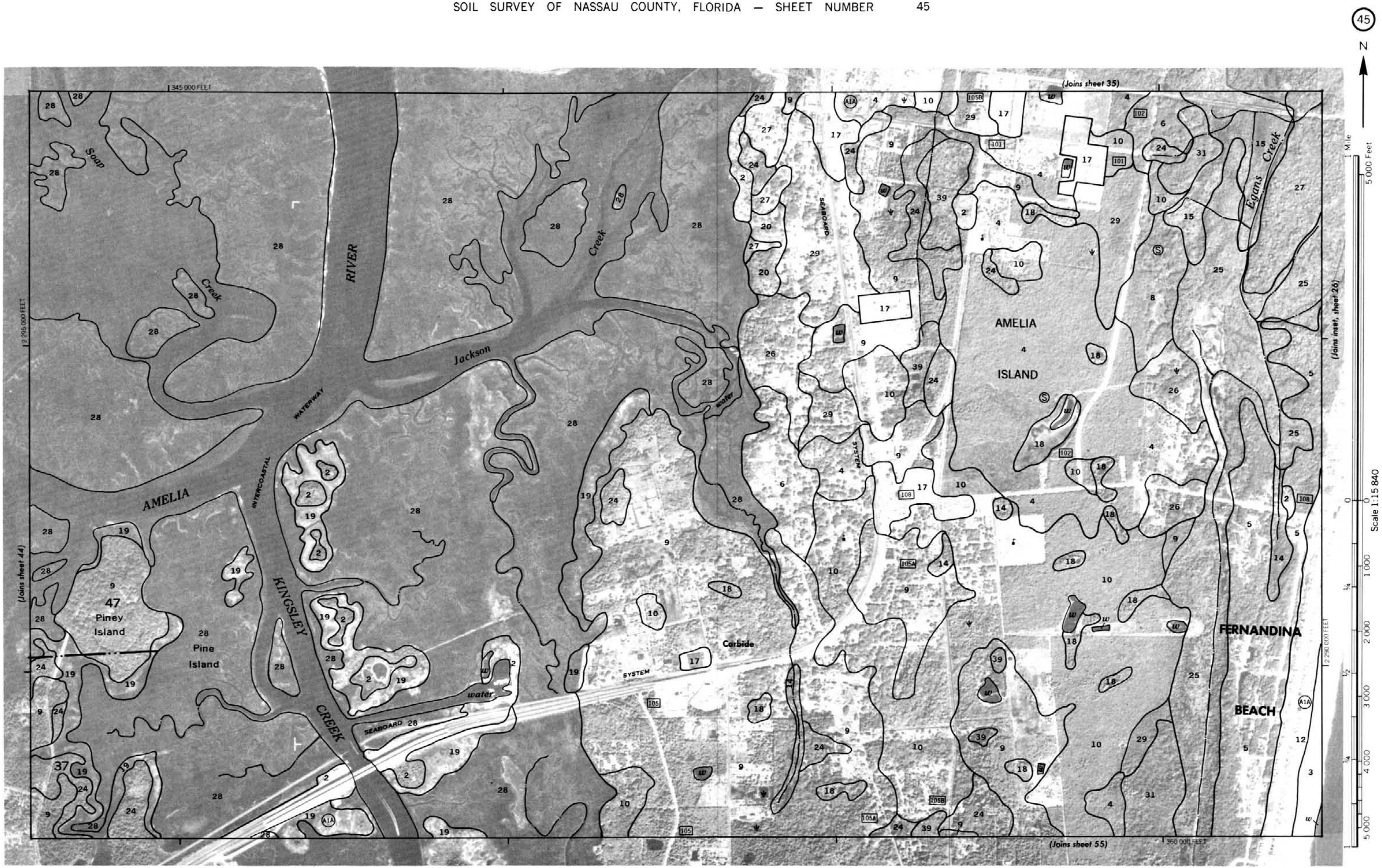

N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 30)
(Joins sheet 39)
(Joins sheet 41)
(Joins sheet 50)
R. 25 E.
R. 26 E.
T. 3 N.
T. 2 N.
260 000 FEET
245 000 FEET
2 295 000 FEET
2 290 000 FEET
Spell Swamp
Spell Swamp
Mills Creek
28
27
43
44
26
25
45
25
46
47
36
34
35
48
47
33
4
3
2
1
49
38
39
40
36
38
1

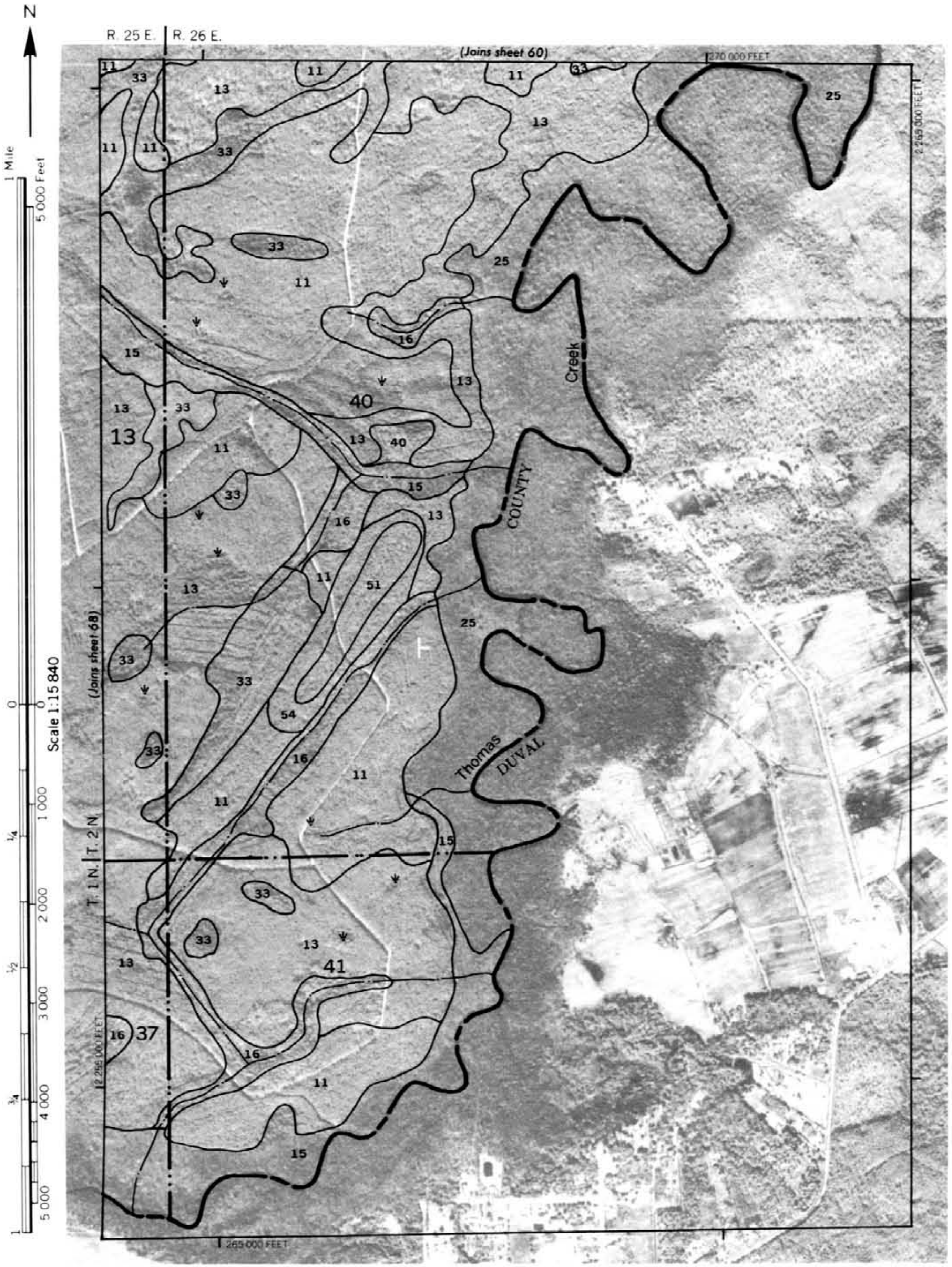

N
R. 26 E.
265 000 FEET
(Joins sheet 31)
(Joins sheet 42)
(Joins sheet 40)
(Joins sheet 51)
2 295 000 FEET
2 290 000 FEET
280 000 FEET
T. 2 N.
T. 3 N.
Plummer Swamp
Plummer Swamp
Plummer Swamp
Tom Mann Swamp
27
28
29
30
31
32
33
34
3
4
5
6
47
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
0
1 000
2 000
3 000
4 000
5 000

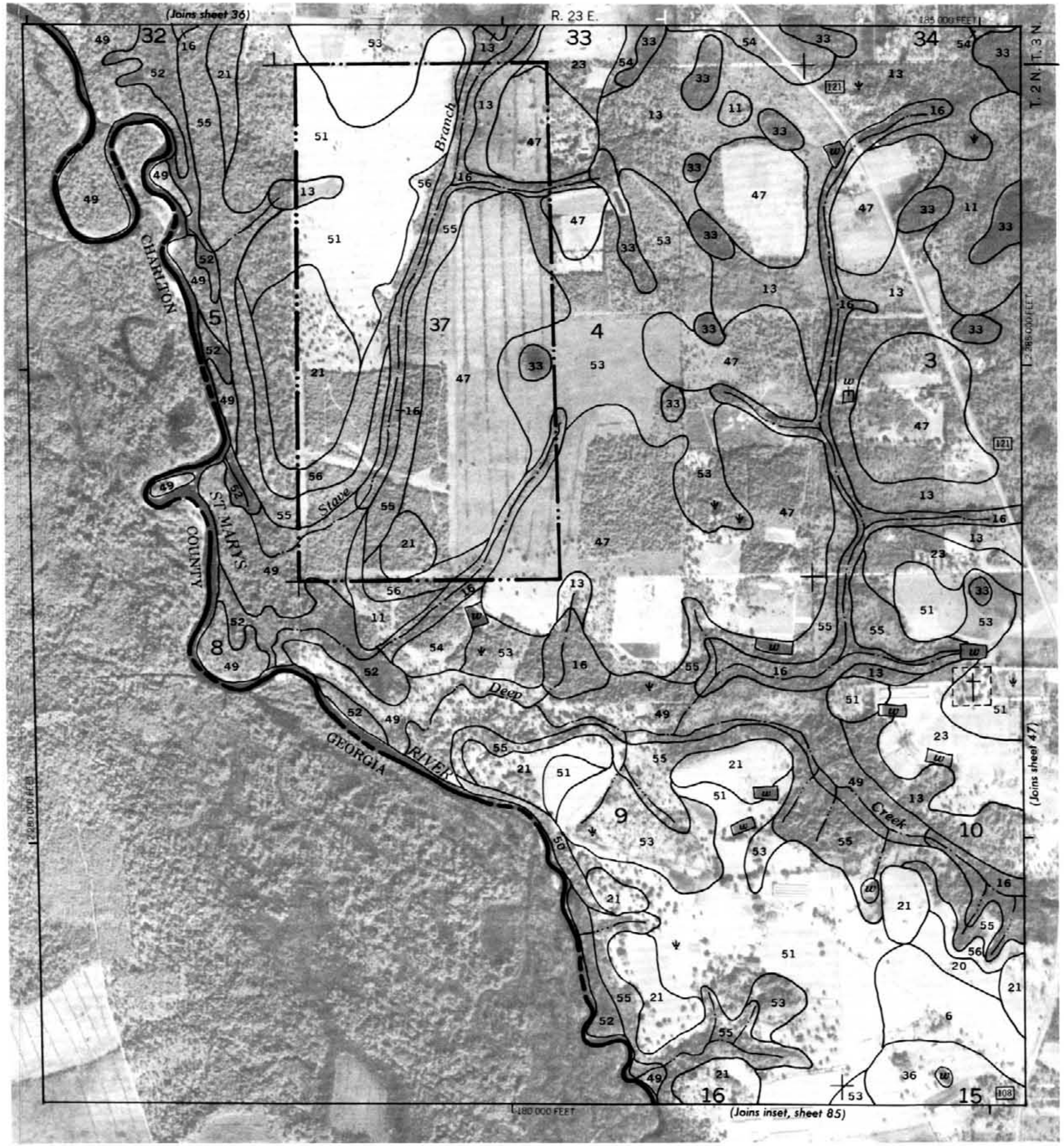

N
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
1 000
2 000
3 000
4 000
5 000
(Joins sheet 32)
(Joins sheet 41)
(Joins sheet 43)
(Joins sheet 52)
R. 26 E.
R. 27 E.
T. 3 N.
T. 2 N.
300 000 FEET
285 000 FEET
2 290 000 FEET
2 295 000 FEET
Plummer Swamp
SEABOARD SYSTEM
95
17
A1A
water
w
32
41
50
42
56
26
27
35
34
3
2
40
13
16
22
33
15
9
10
6
11
36

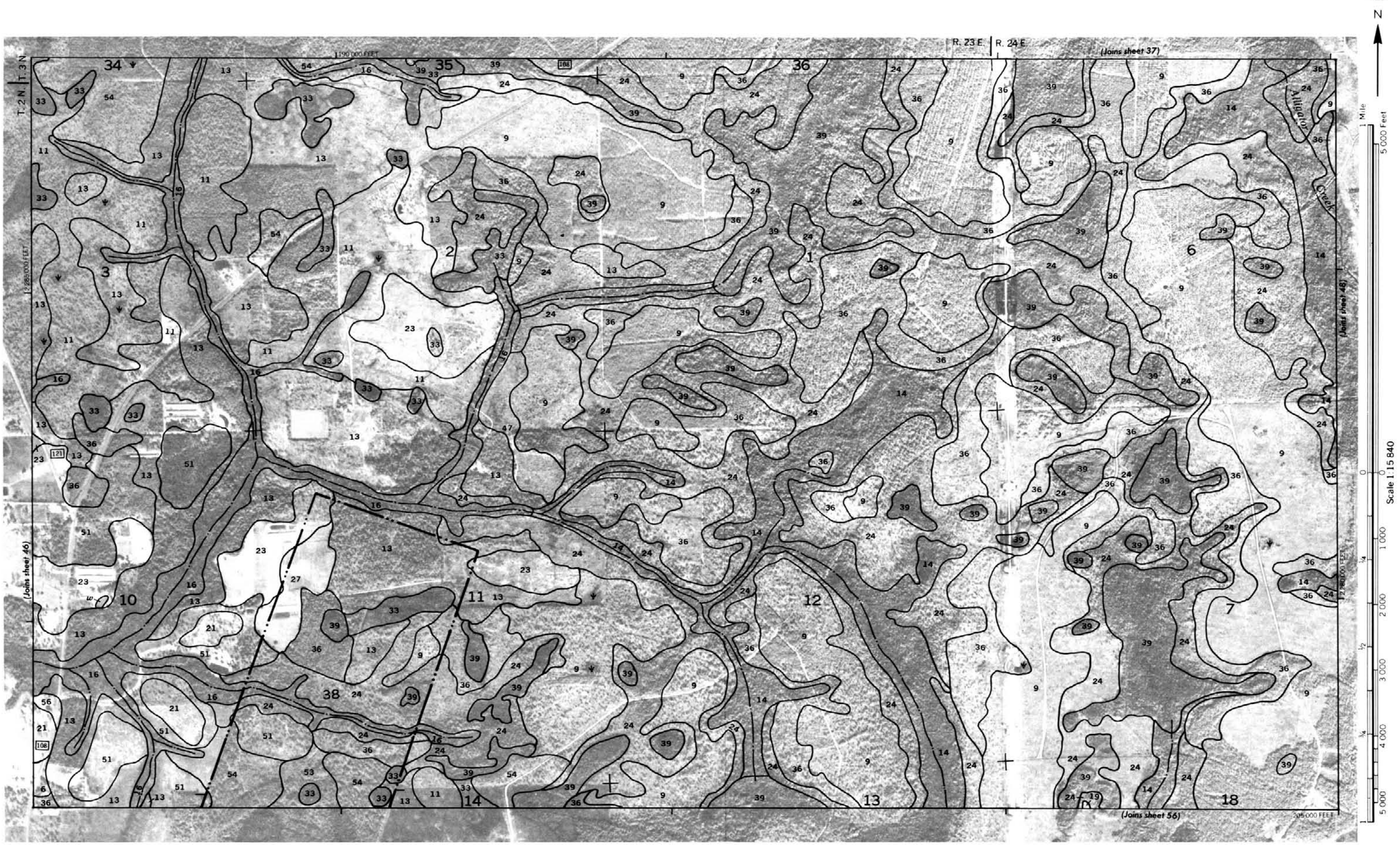

N
R. 27 E.
305 000 FEET
(Joins sheet 33)
(Joins sheet 42)
(Joins sheet 44)
(Joins sheet 53)
320 000 FEET
2 295 000 FEET
2 290 000 FEET
T. 3 N.
T. 2 N.
McQueen Creek
Lofton Creek
Branch
Blounts
Lofton Creek
SEABOARD SYSTEM
YULEE
Vaughn Landing
water
17
200A
A1A
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000


N
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1
0
1 000
2 000
3 000
4 000
5 000
(Joins sheet 34)
R. 27 E.
R. 28 E.
(Joins sheet 43)
(Joins sheet 45)
(Joins sheet 54)
T. 3 N.
T. 2 N.
340 000 FEET
2 295 000 FEET
2 290 000 FEET
325 000 FEET
Lofton
SEABOARD
SYSTEM
SANITARY LANDFILL
Black Rock
Lanceford Creek
water
Johnson Neck
AMELIA RIVER
200A
A1A

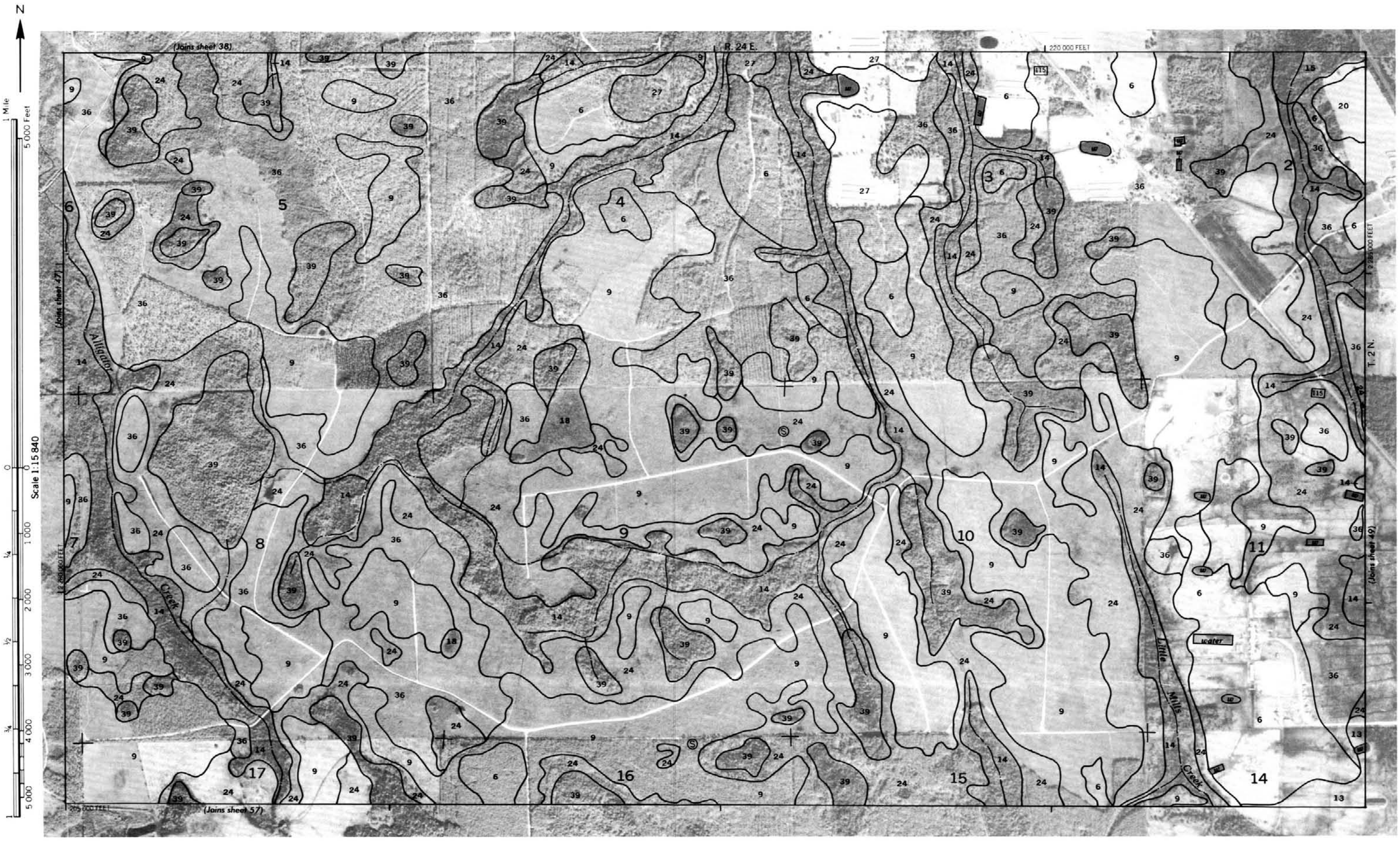

45
N
(Joins sheet 35)
(Joins sheet 55)
(Joins sheet 44)
(Joins inset, sheet 26)
345 000 FEET
360 000 FEET
2 296 000 FEET
2 290 000 FEET
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1 000
2 000
3 000
4 000
5 000
Soap
Creek
AMELIA
RIVER
Jackson
Creek
INTERCOASTAL
WATERWAY
KINGSLEY
CREEK
Piney
Island
Pine
Island
water
SEABOARD
SYSTEM
Carbide
AMELIA
ISLAND
Egans
Creek
FERNANDINA
BEACH
A1A
105
105A
105B
101
102
108
w
47
37

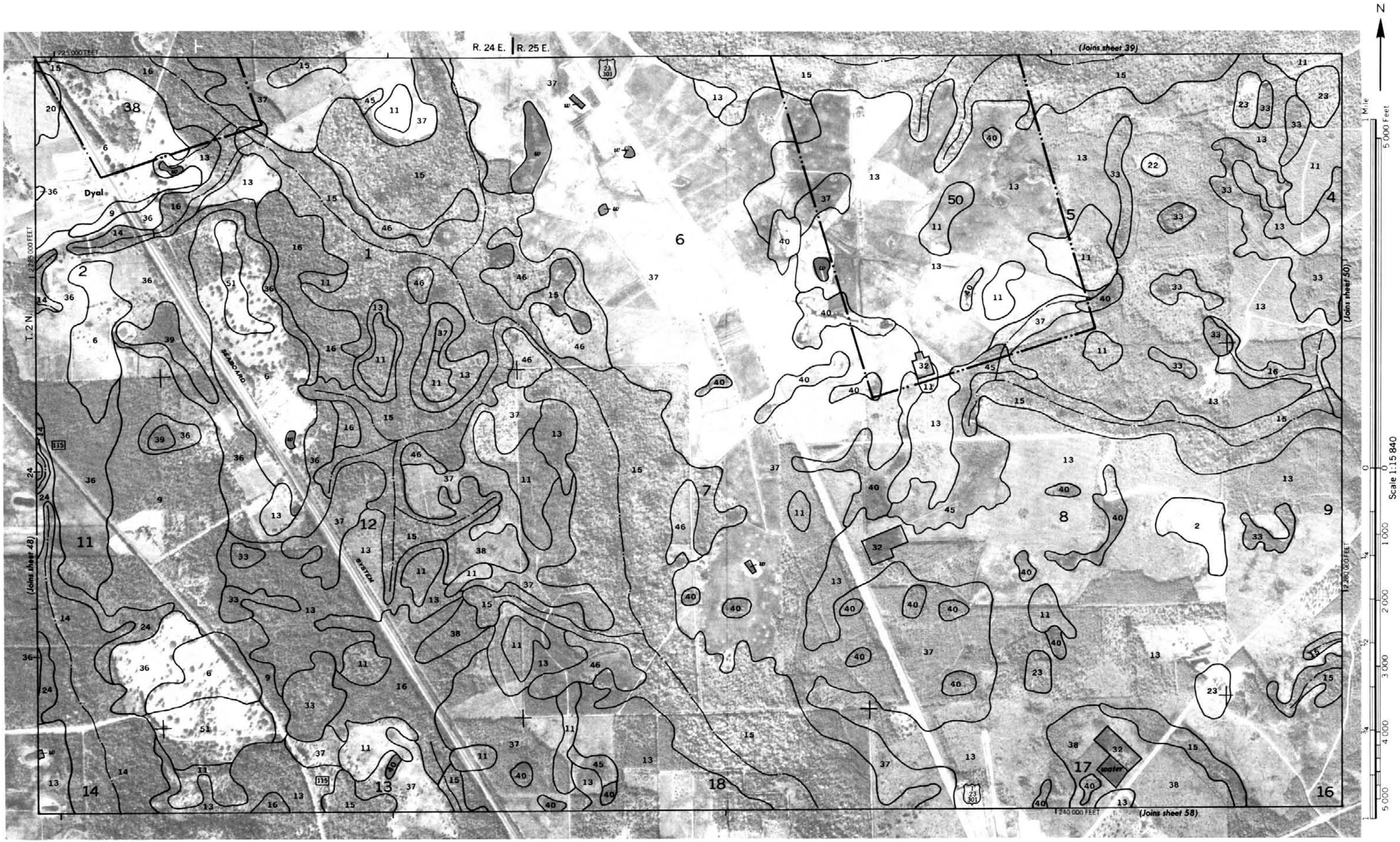

N
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1
0
1 000
2 000
3 000
4 000
5 000
R. 25 E.
R. 26 E.
(Joins sheet 60)
(Joins sheet 68)
270 000 FEET
2 295 000 FEET
2 265 000 FEET
265 000 FEET
T. 2 N.
T. 1 N.
Thomas
Creek
DUVAL
COUNTY
11
13
15
16
25
33
37
40
41
51
54

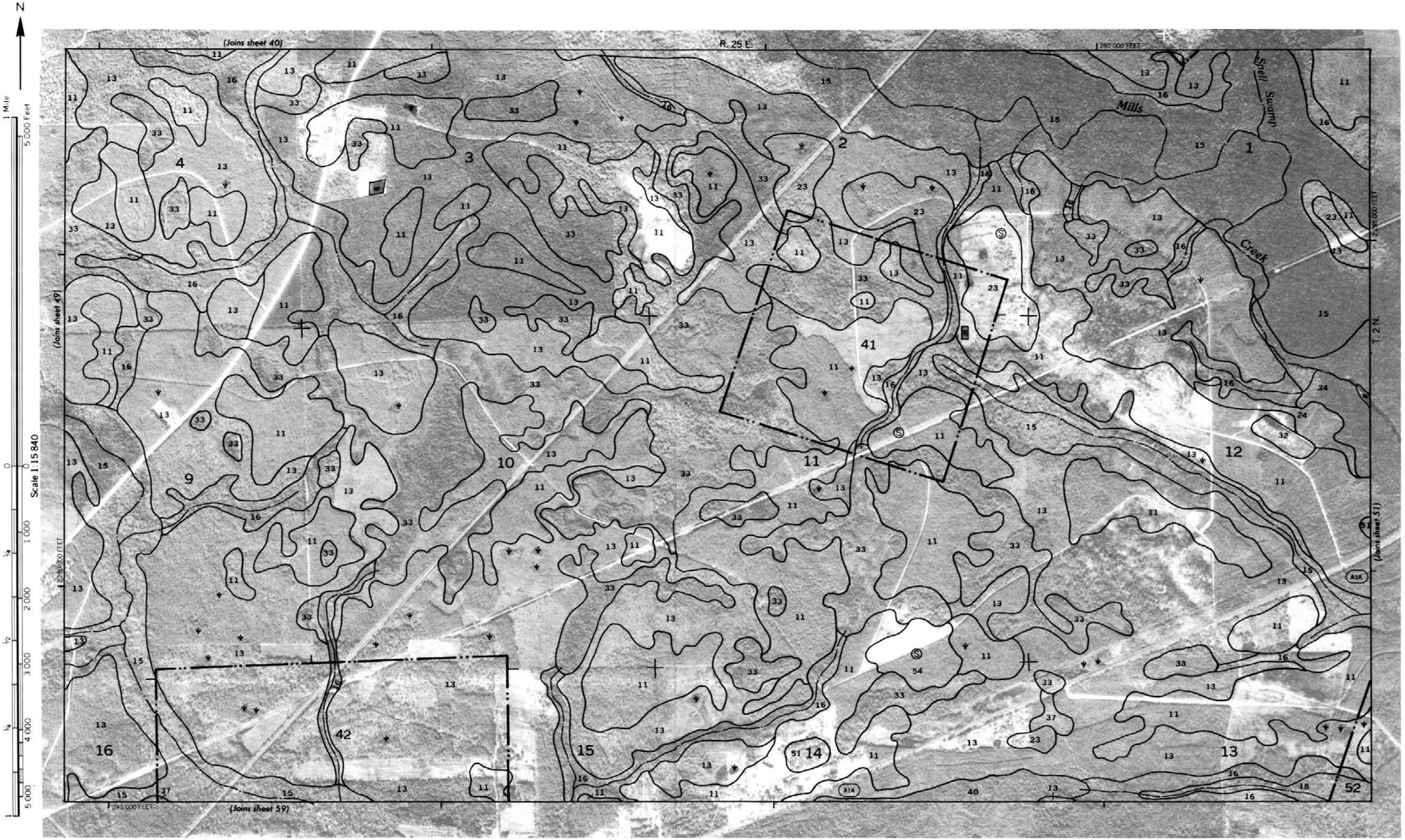

(Joins sheet 36)
R. 23 E.
185 000 FEET
T. 3 N.
T. 2 N.
(Joins sheet 47)
(Joins inset, sheet 85)
180 000 FEET
CHARLTON
COUNTY
ST. MARYS
GEORGIA
RIVER
Stave
Branch
Deep
Creek
121
108
3
4
5
8
9
10
15
16
32
33
34
37
49
51
53
55

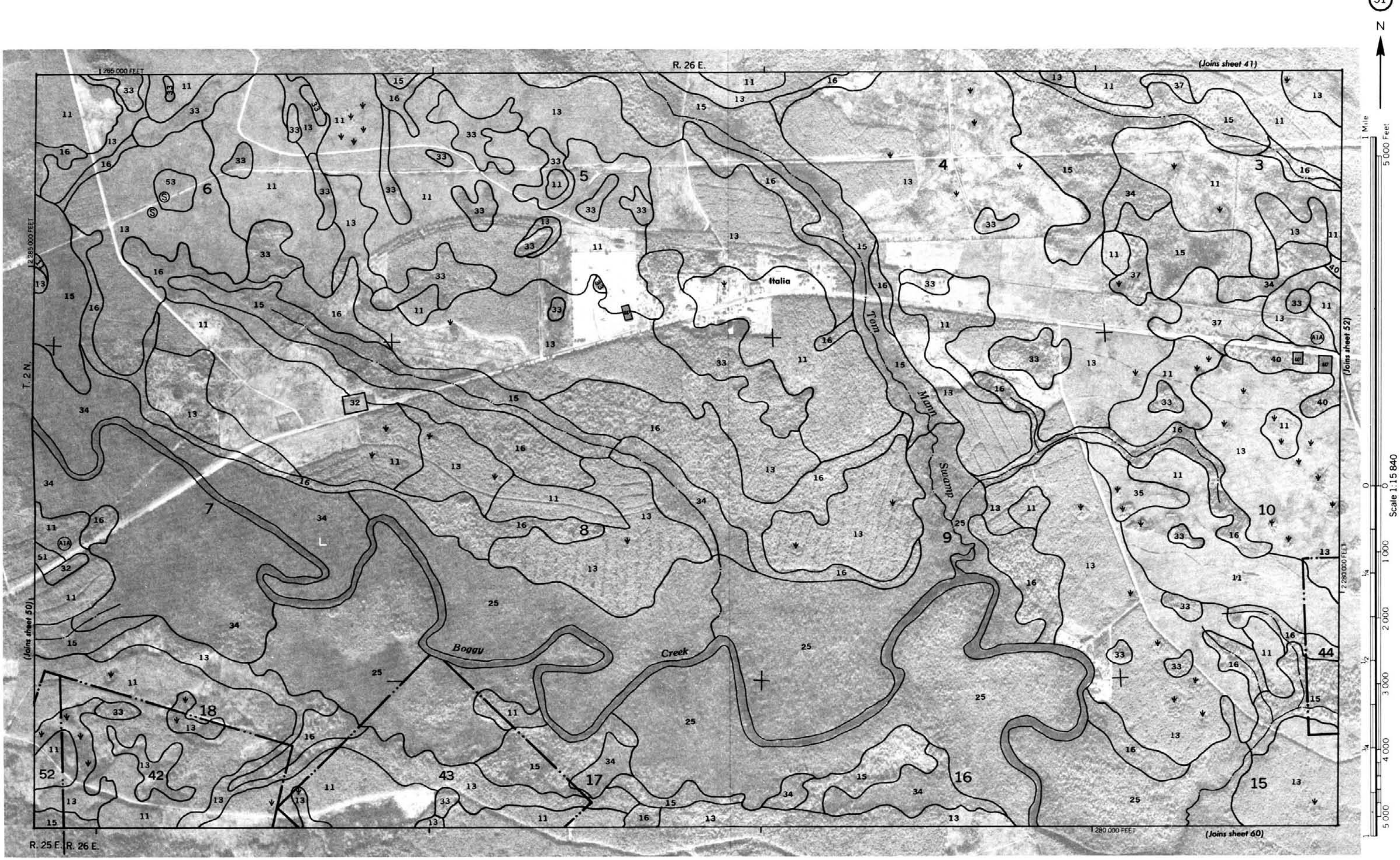

47
N
R. 23 E.
R. 24 E.
(Joins sheet 37)
190 000 FEET
T. 2 N.
T. 3 N.
2 285 000 FEET
(Joins sheet 46)
(Joins sheet 48)
(Joins sheet 56)
2 280 000 FEET
205 000 FEET
Alligator Creek
121
108
34
35
36
1
2
3
6
7
10
11
12
13
14
18
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾

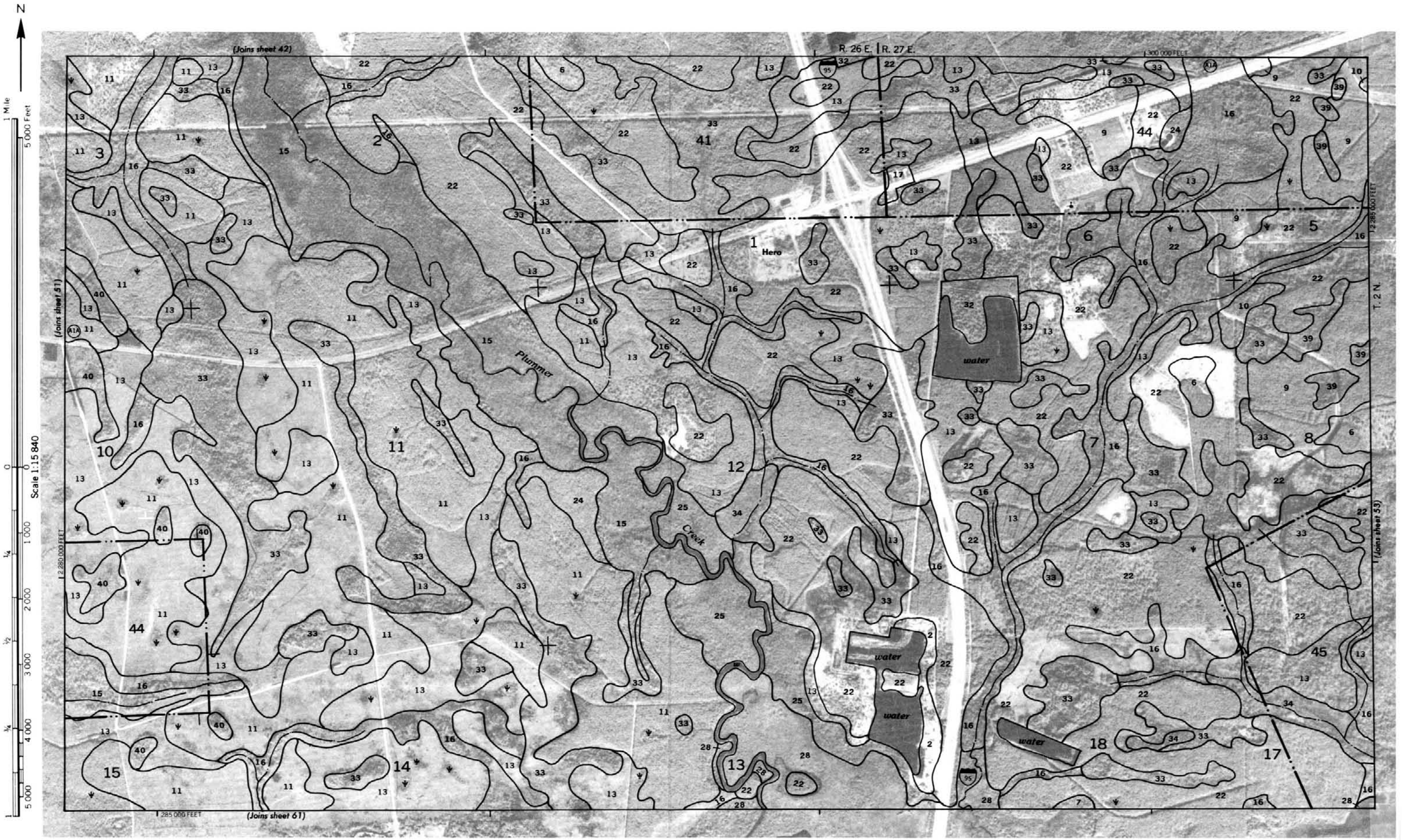
SOIL SURVEY OF NASSAU COUNTY, FLORIDA — SHEET NUMBER 48

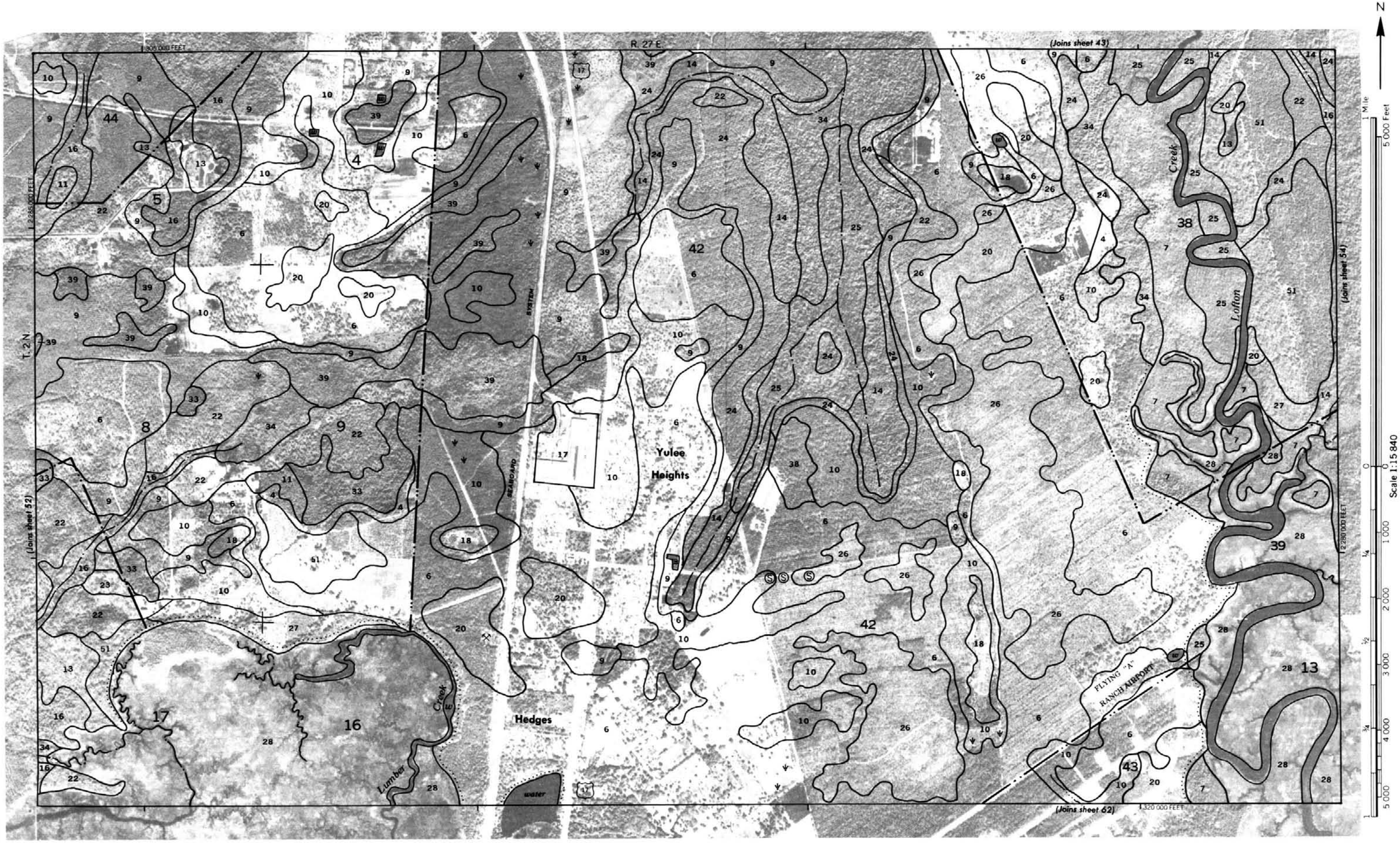

N
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
0
1 000
2 000
3 000
4 000
5 000
(Joins sheet 38)
(Joins sheet 47)
(Joins sheet 49)
(Joins sheet 57)
R. 24 E.
T. 2 N.
220 000 FEET
205 000 FEET
Alligator Creek
Little Mills Creek
115
water

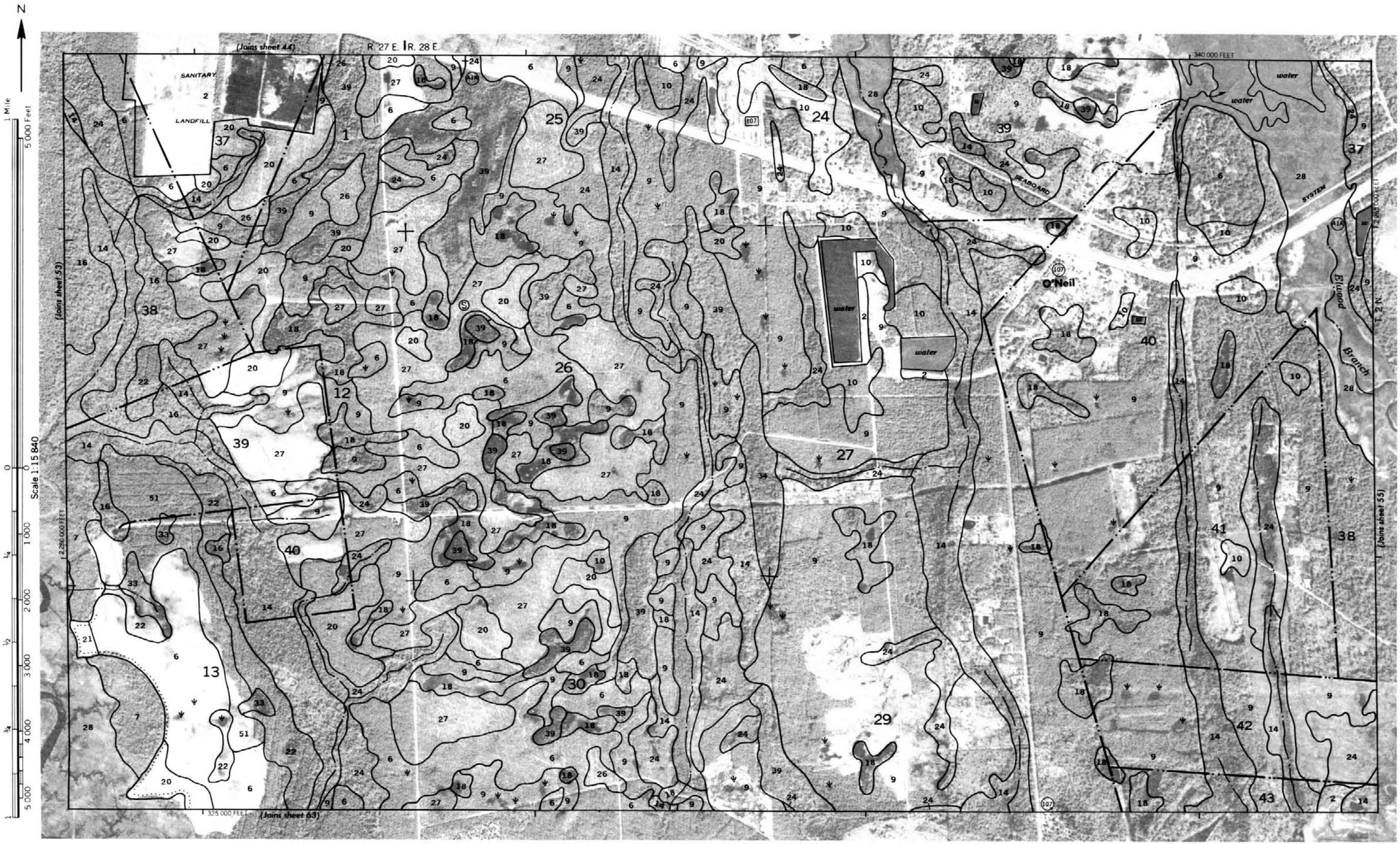

N
R. 24 E.
R. 25 E.
T. 2 N.
225 000 FEET
2 285 000 FEET
2 280 000 FEET
240 000 FEET
(Joins sheet 39)
(Joins sheet 50)
(Joins sheet 58)
(Joins sheet 48)
Dyal
SEABOARD
SYSTEM
23
301
115
w
water
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1
0
1 000
2 000
3 000
4 000
5 000

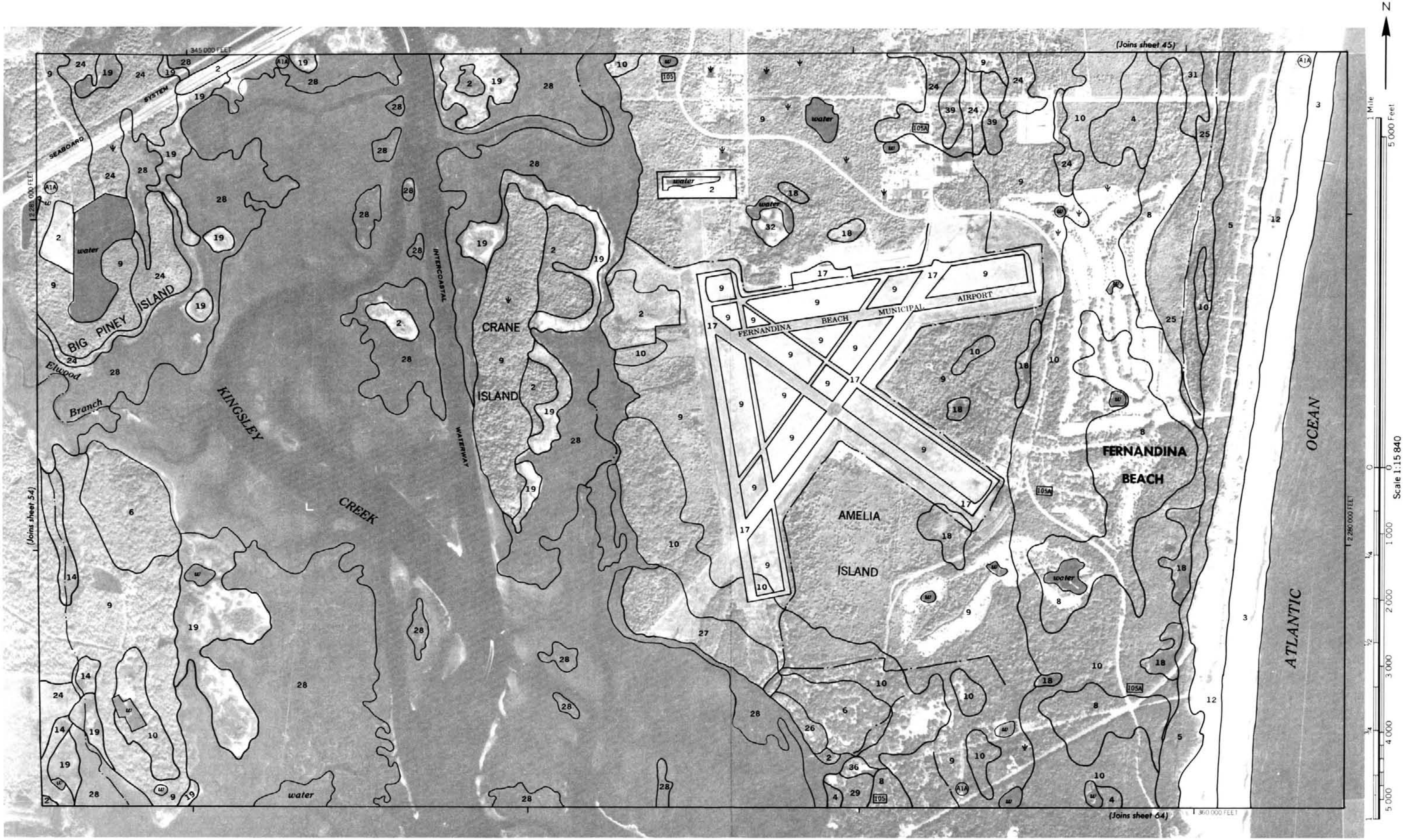

N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 40)
R. 25 E.
260 000 FEET
Shell Swamp
Mills Creek
T. 2 N.
2 280 000 FEET
(Joins sheet 49)
(Joins sheet 51)
(Joins sheet 59)
245 000 FEET
A1A

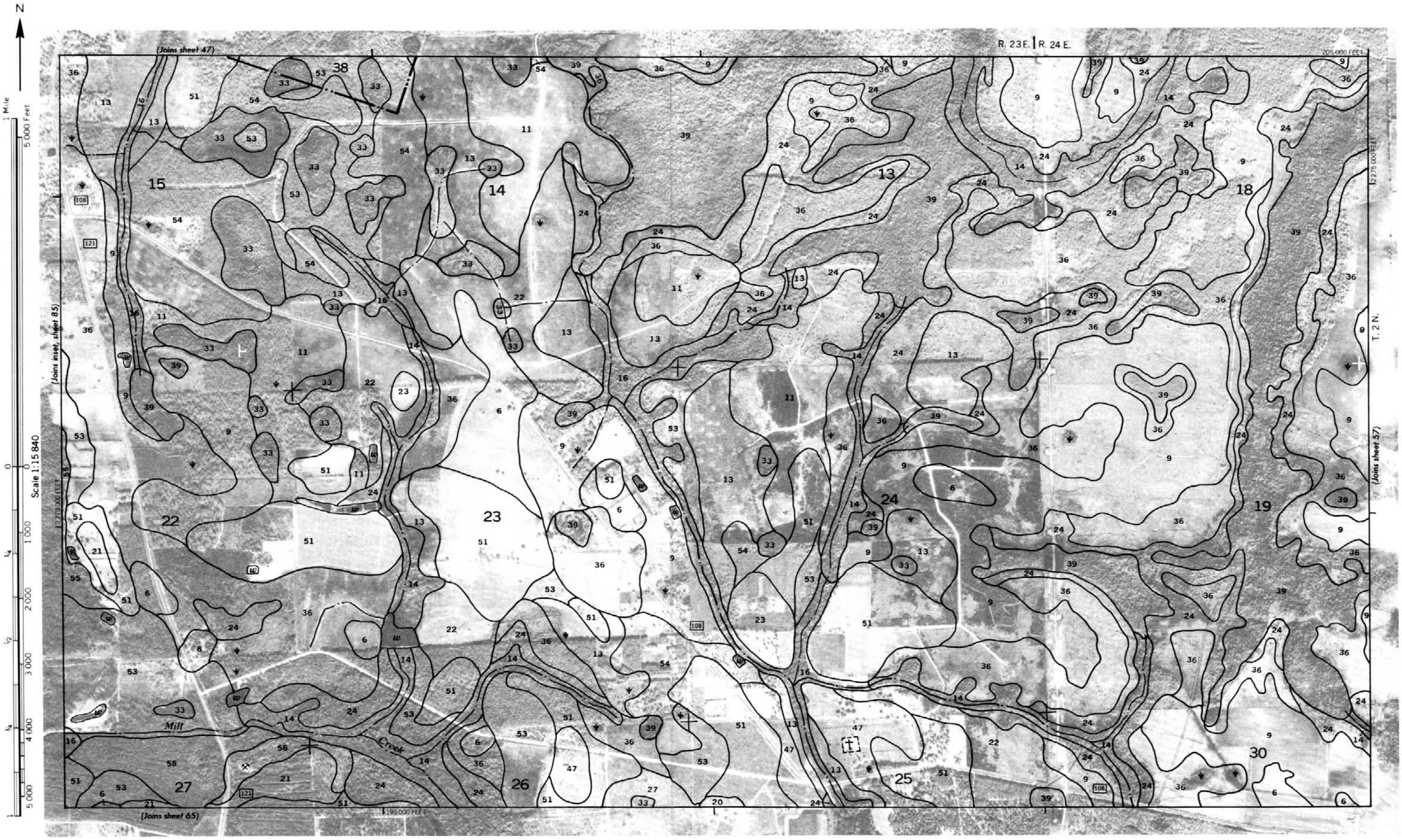

(51)
N
R. 26 E.
(Joins sheet 41)
(Joins sheet 52)
(Joins sheet 50)
(Joins sheet 60)
T. 2 N.
R. 25 E. R. 26 E.
1 285 000 FEET
2 285 000 FEET
2 280 000 FEET
1 280 000 FEET
Italia
Tom Mann Swamp
Boggy Creek
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾

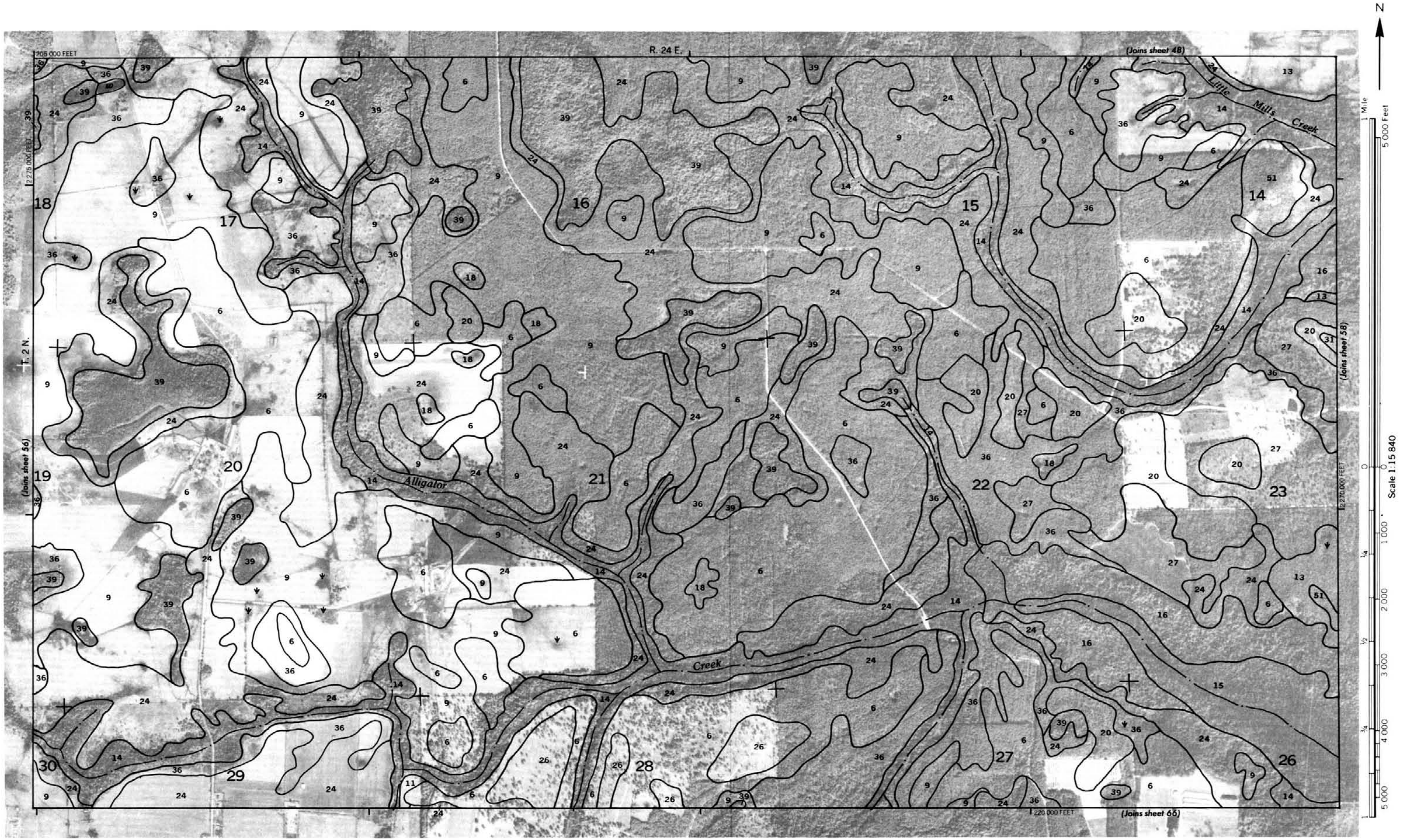

N
1 Mile
5 000 Feet
0
1/4
1/2
3/4
1
1 000
2 000
3 000
4 000
5 000
Scale 1:15 840
(Joins sheet 42)
R. 26 E.
R. 27 E.
300 000 FEET
2 285 000 FEET
T. 2 N.
(Joins sheet 51)
(Joins sheet 53)
(Joins sheet 61)
2 280 000 FEET
285 000 FEET
A1A
95
Hero
Plummer
Creek
water

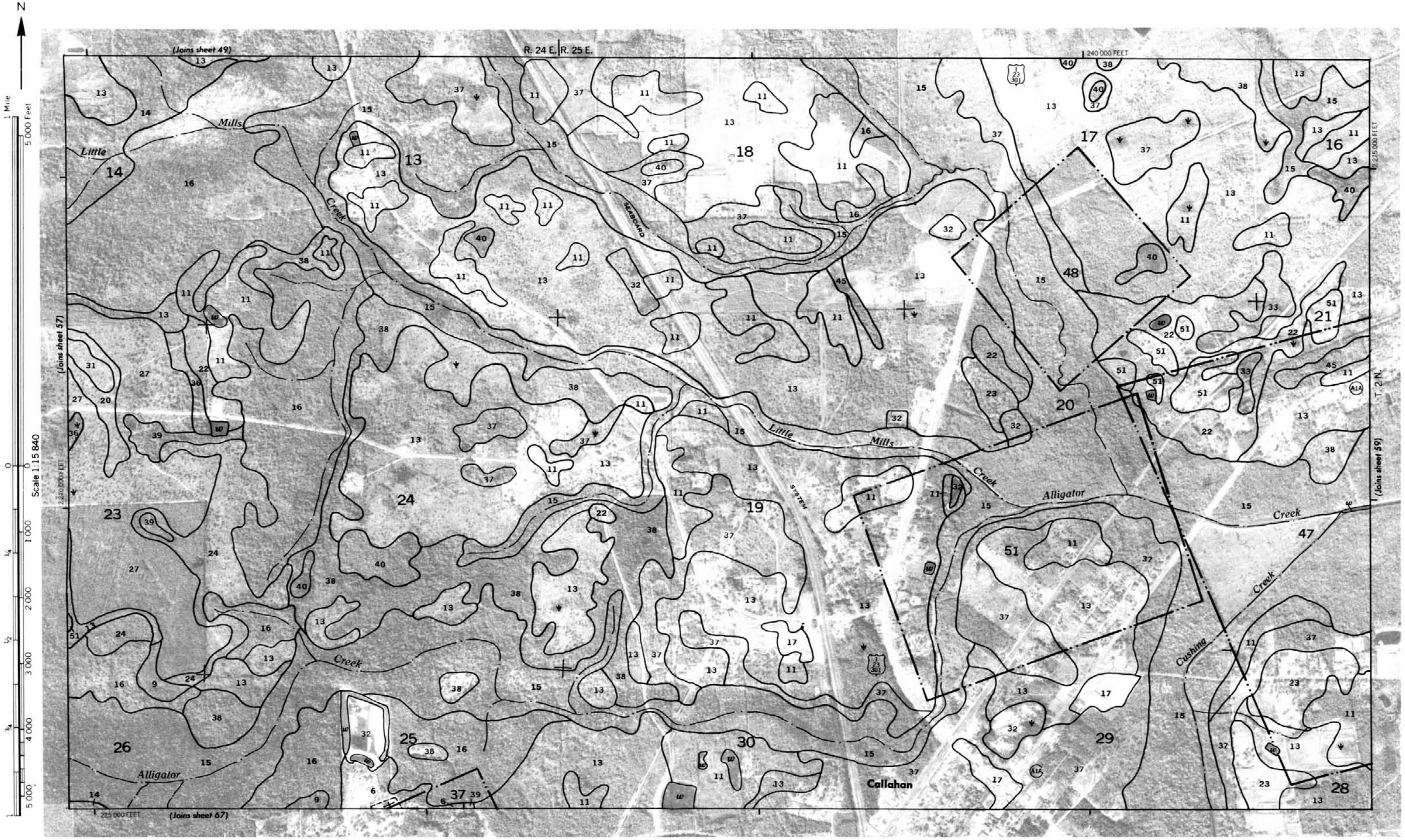

N
R. 27 E.
(Joins sheet 43)
(Joins sheet 54)
(Joins sheet 62)
(Joins sheet 52)
T. 2 N.
305 000 FEET
320 000 FEET
2 285 000 FEET
2 280 000 FEET
Yulee
Heights
Hedges
SEABOARD
SYSTEM
FLYING "A"
RANCH AIRPORT
Lofton
Creek
Lumber
Creek
water
17
1 Mile
5 000 Feet
0
¼
½
¾
1
1 000
2 000
3 000
4 000
5 000
Scale 1:15 840

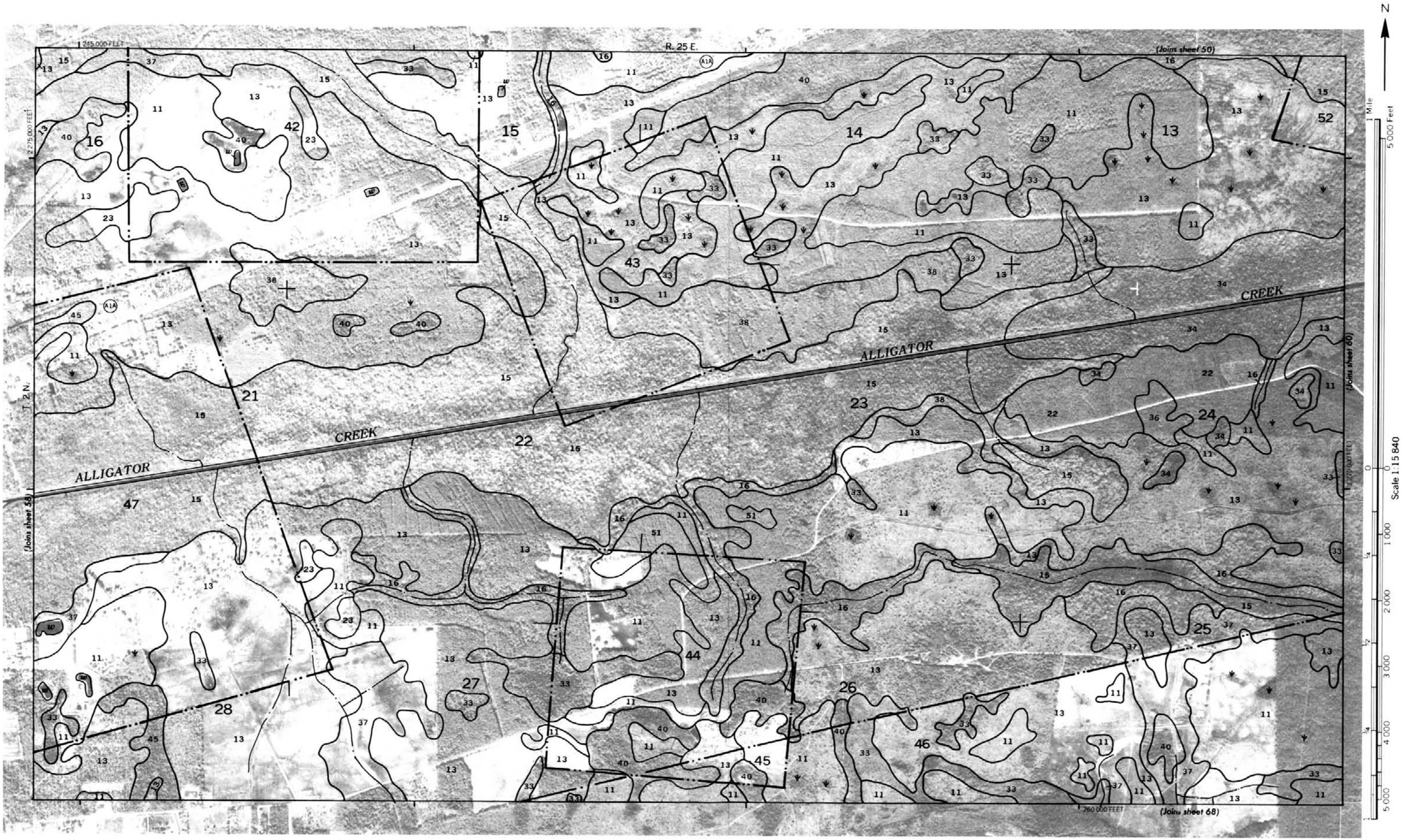

N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 44)
R. 27 E.
R. 28 E.
SANITARY
LANDFILL
(Joins sheet 53)
(Joins sheet 55)
(Joins sheet 63)
340 000 FEET
2 280 000 FEET
325 000 FEET
T. 2 N.
SEABOARD
SYSTEM
O'Neil
water
Elwood
Branch
107
A1A

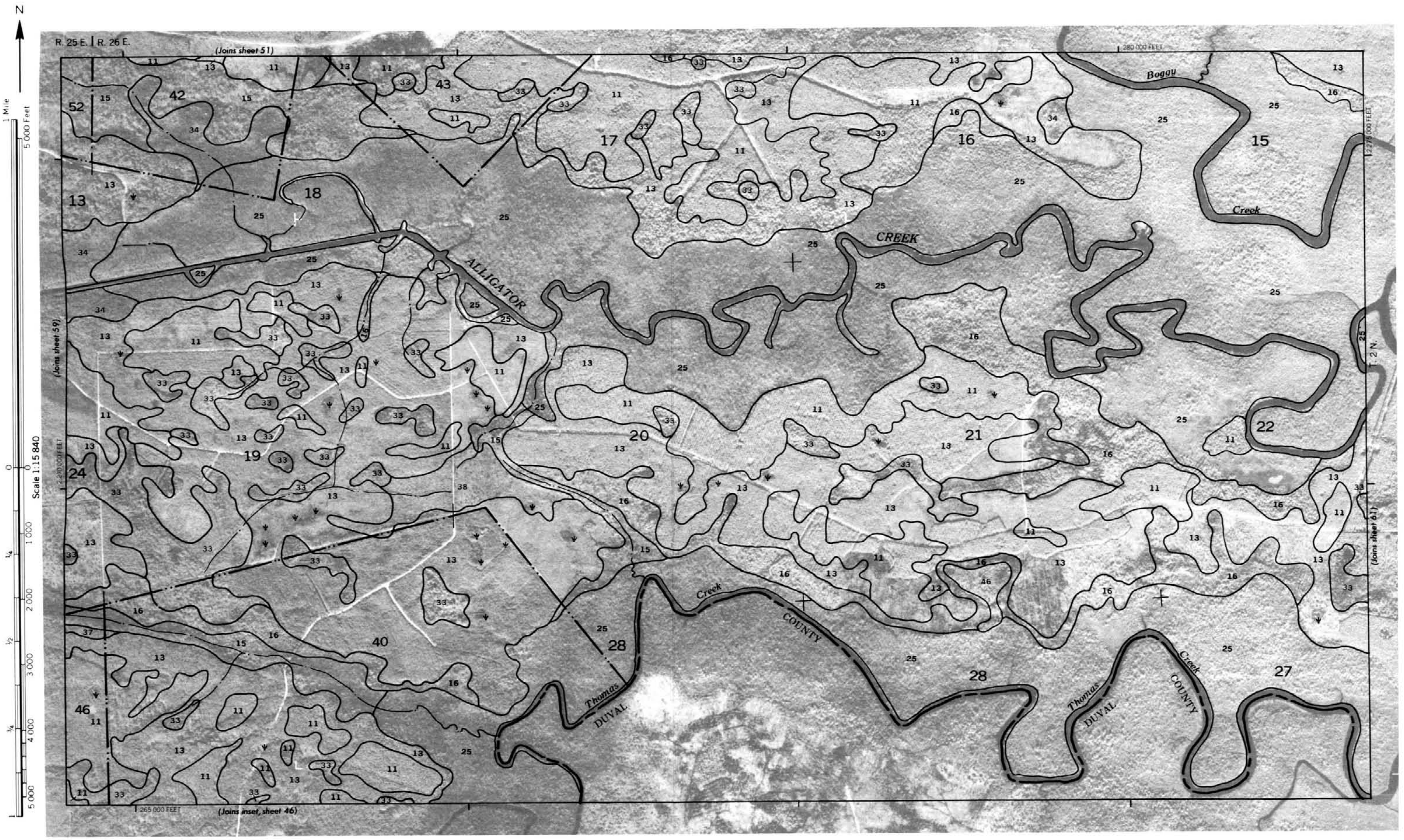

N
(Joins sheet 45)
(Joins sheet 54)
(Joins sheet 64)
345 000 FEET
360 000 FEET
2 280 000 FEET
2 290 000 FEET
SEABOARD SYSTEM
A1A
105
105A
BIG PINEY ISLAND
Elwood Branch
KINGSLEY CREEK
INTRACOASTAL WATERWAY
CRANE ISLAND
FERNANDINA BEACH MUNICIPAL AIRPORT
AMELIA ISLAND
FERNANDINA BEACH
ATLANTIC OCEAN
water
w
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1 000
2 000
3 000
4 000
5 000

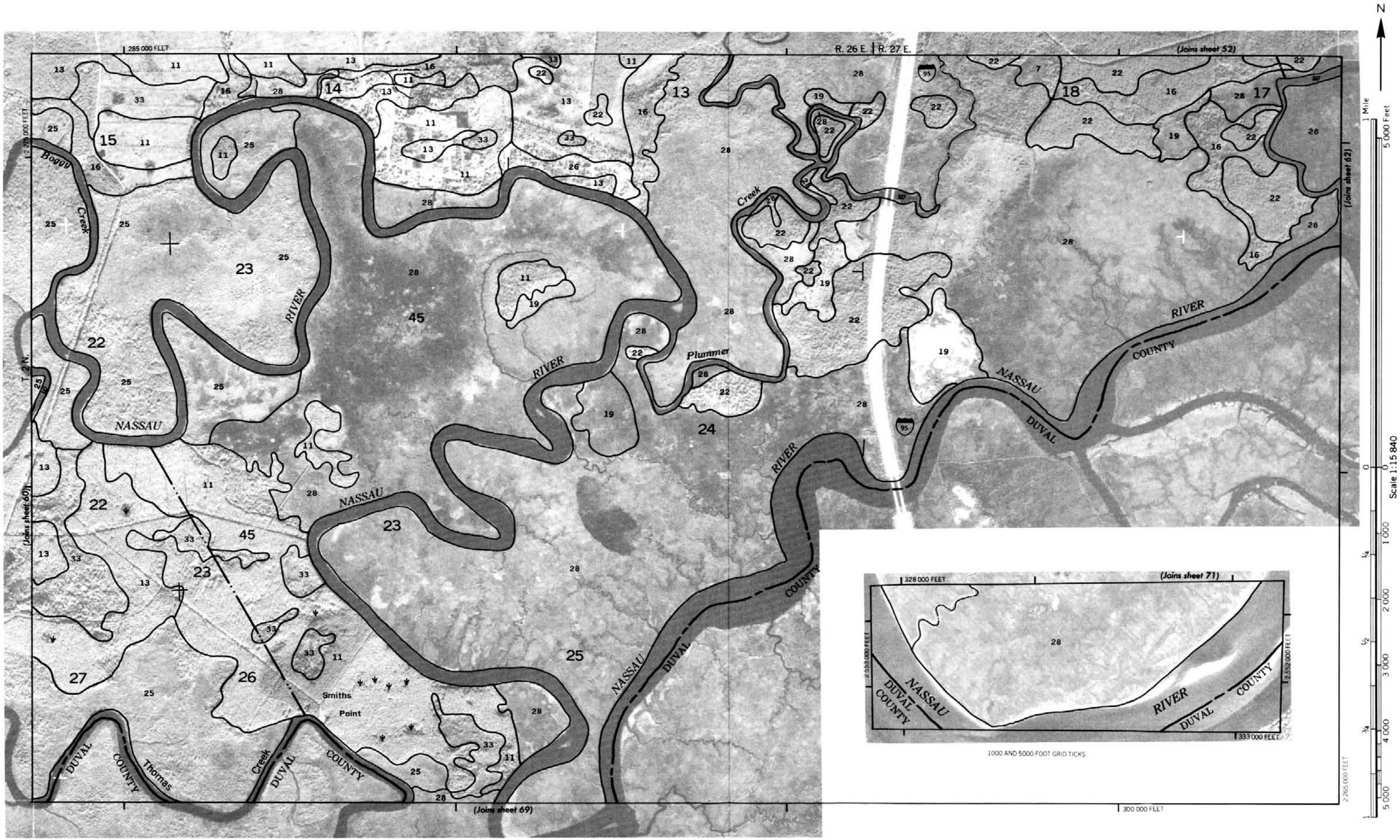

N
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
(Joins sheet 47)
(Joins sheet 65)
(Joins inset, sheet 85)
(Joins sheet 57)
R. 23 E.
R. 24 E.
T. 2 N.
205 000 FEET
2 275 000 FEET
2 270 000 FEET
190 000 FEET
Mill
Creek
108
121


N
205 000 FEET
R. 24 E.
(Joins sheet 48)
2 275 000 FEET
T. 2 N.
(Joins sheet 56)
(Joins sheet 58)
2 270 000 FEET
220 000 FEET
(Joins sheet 66)
Little Mills Creek
Alligator Creek
14
15
16
17
18
19
20
21
22
23
26
27
28
29
30
1 Mile
5 000 Feet
0
1/4
1/2
3/4
1
1 000
2 000
3 000
4 000
5 000
Scale 1:15 840

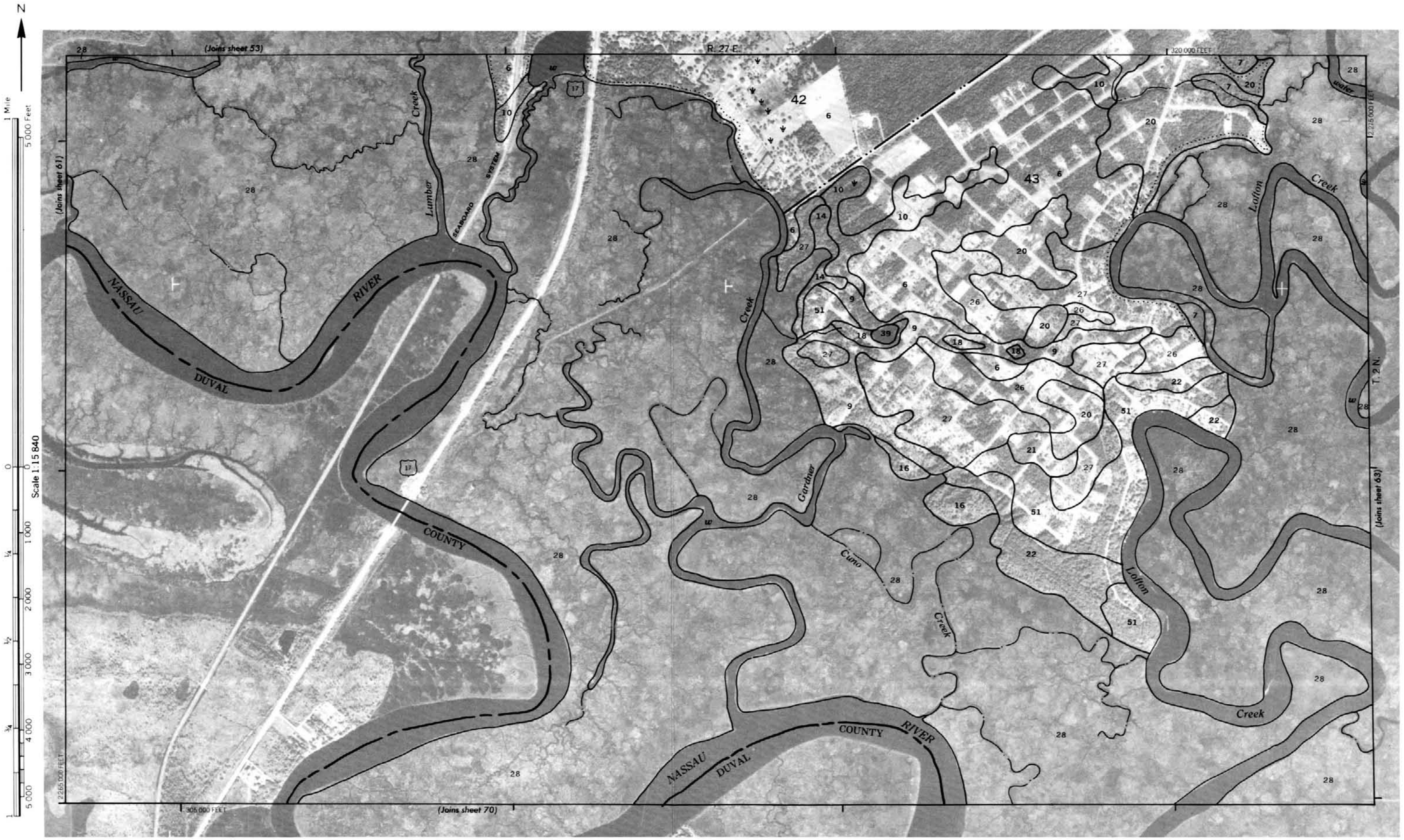

N
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
0
1 000
2 000
3 000
4 000
5 000
(Joins sheet 49)
(Joins sheet 57)
(Joins sheet 59)
(Joins sheet 67)
R. 24 E.
R. 25 E.
240 000 FEET
2 275 000 FEET
2 270 000 FEET
225 000 FEET
T. 2 N.
Little
Mills
Creek
Alligator
Creek
Cushing
Creek
SEABOARD
SYSTEM
Callahan
23
301
A1A

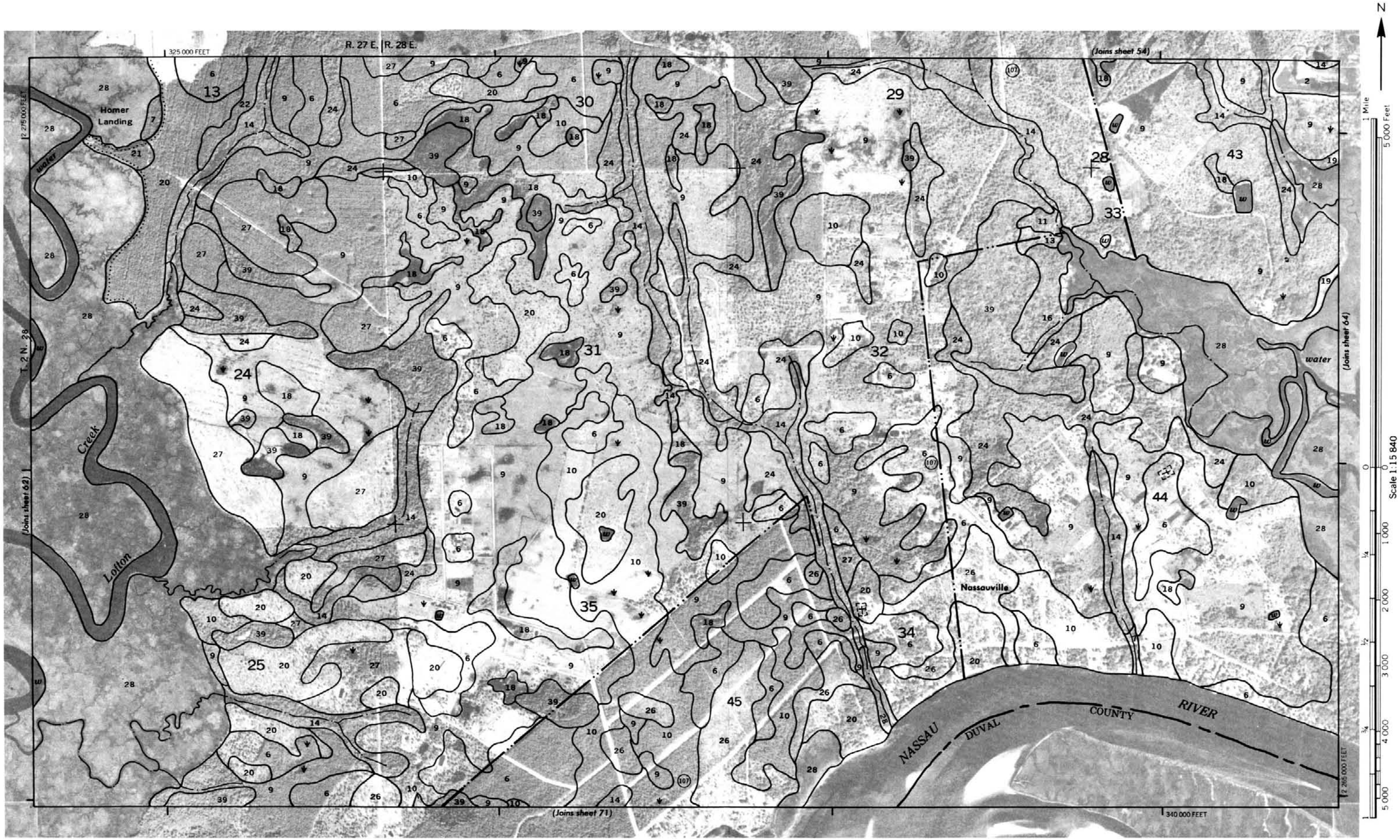

N
ALLIGATOR CREEK
ALLIGATOR CREEK
R. 25 E.
T. 2 N.
245 000 FEET
2 275 000 FEET
260 000 FEET
(Joins sheet 50)
(Joins sheet 58)
(Joins sheet 60)
(Joins sheet 68)
A1A
16
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000

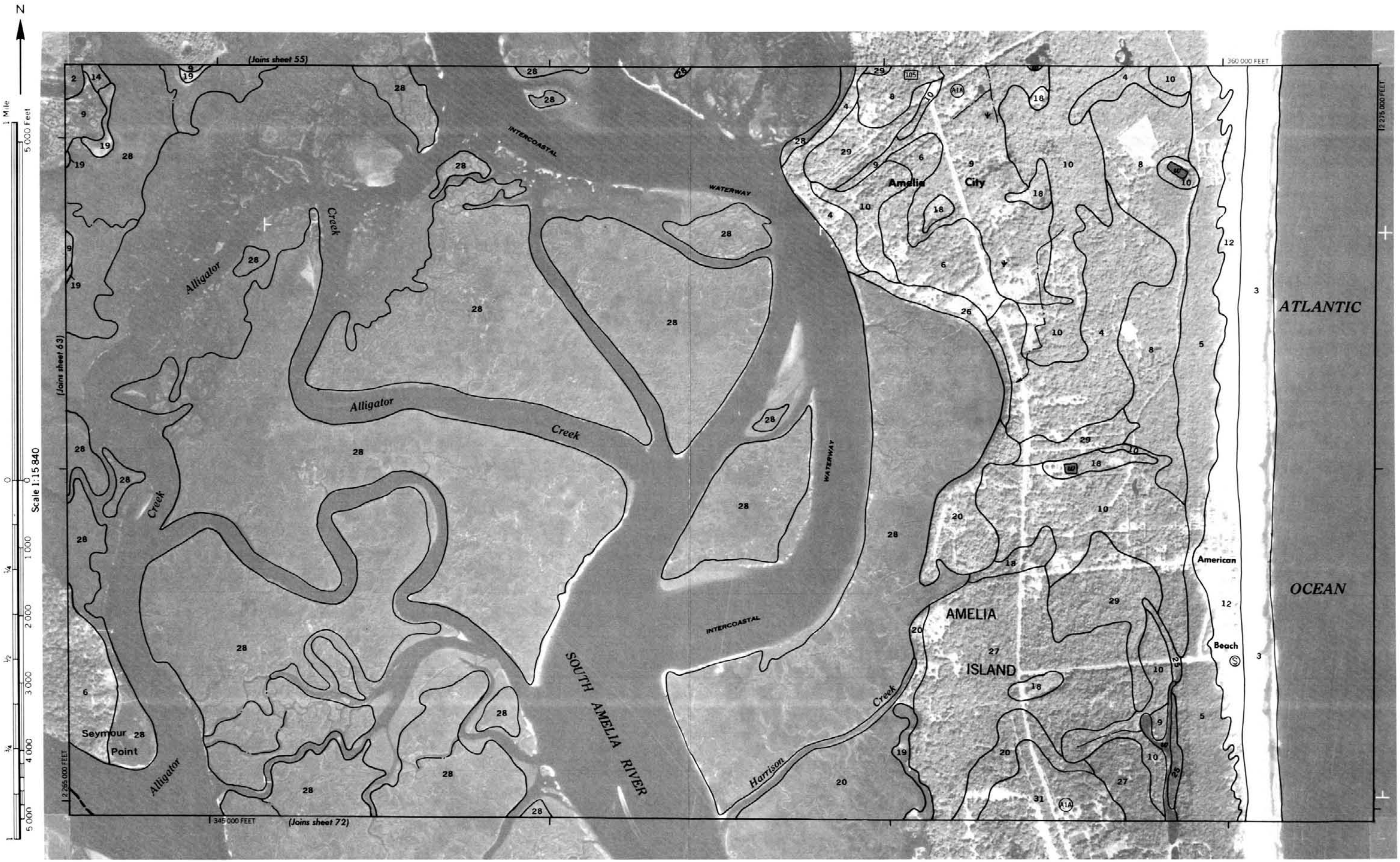

N
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
0
1 000
2 000
3 000
4 000
5 000
R. 25 E.
R. 26 E.
(Joins sheet 51)
280 000 FEET
2 275 000 FEET
T. 2 N.
(Joins sheet 59)
(Joins sheet 61)
2 270 000 FEET
265 000 FEET
(Joins inset, sheet 46)
Boggy Creek
ALLIGATOR CREEK
Thomas Creek
DUVAL COUNTY
52
42
43
17
16
15
13
18
19
20
21
22
24
28
27
40
46
11
25
33
34
37
38

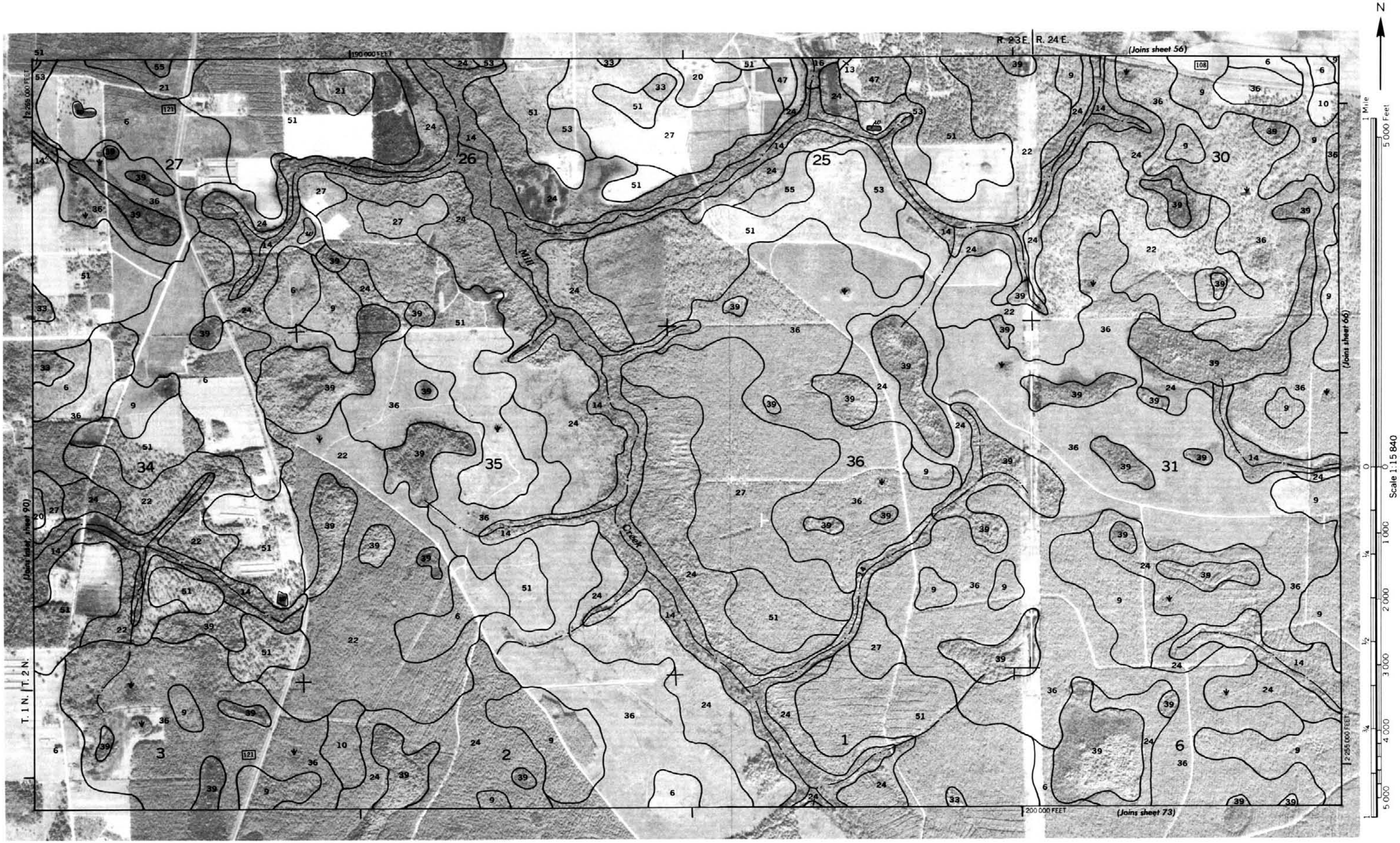

N
285 000 FEET
R. 26 E.
R. 27 E.
(Joins sheet 52)
(Joins sheet 62)
(Joins sheet 60)
(Joins sheet 69)
(Joins sheet 71)
T. 2 N.
Boggy Creek
NASSAU RIVER
Plummer Creek
NASSAU COUNTY
DUVAL COUNTY
Thomas Creek
Smiths Point
95
328 000 FEET
333 000 FEET
300 000 FEET
2 553 000 FEET
2 552 000 FEET
2 265 000 FEET
1000 AND 5000 FOOT GRID TICKS
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
1
11
13
14
15
16
17
18
19
22
23
24
25
26
27
28
33
45

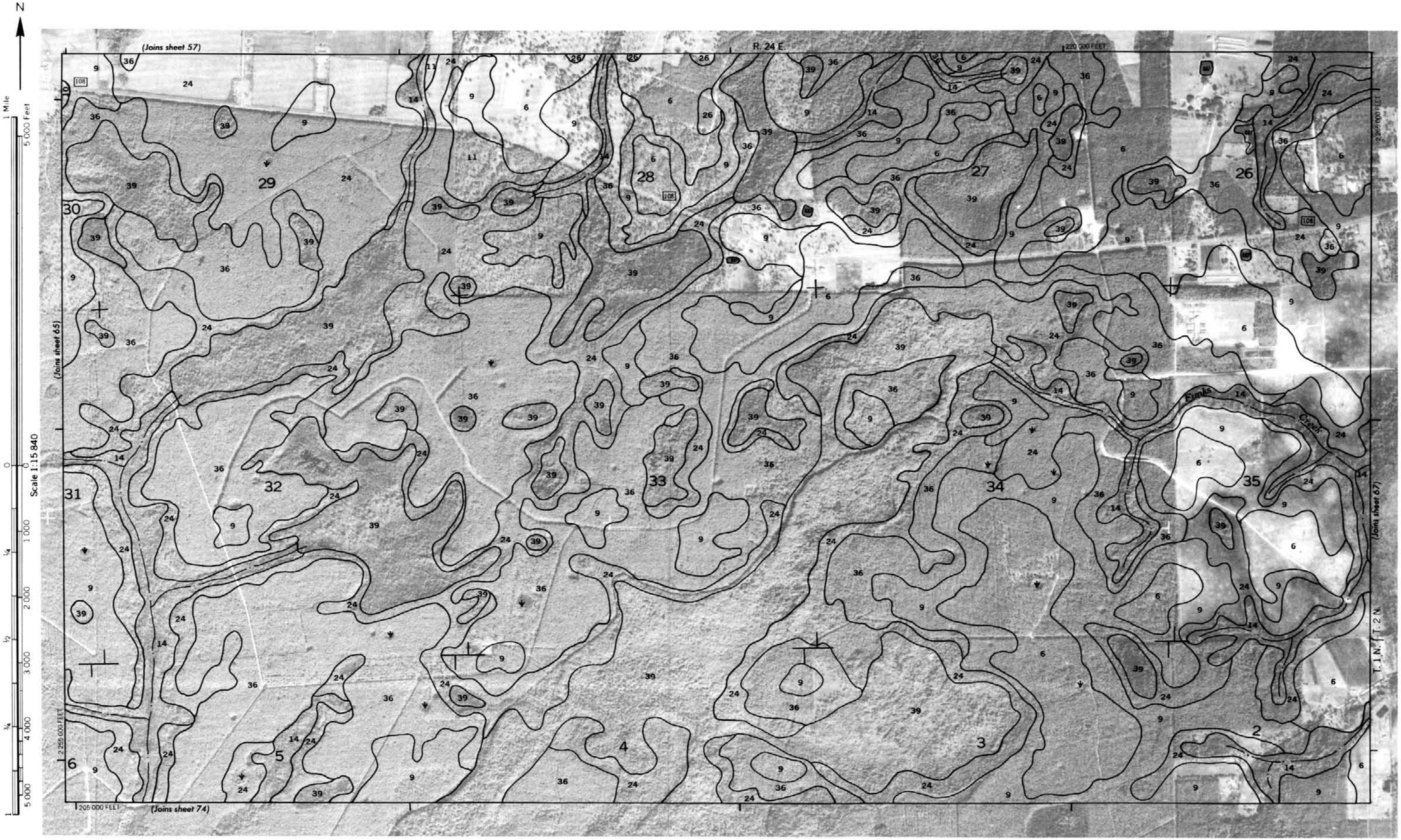
SOIL SURVEY OF NASSAU COUNTY, FLORIDA — SHEET NUMBER 62

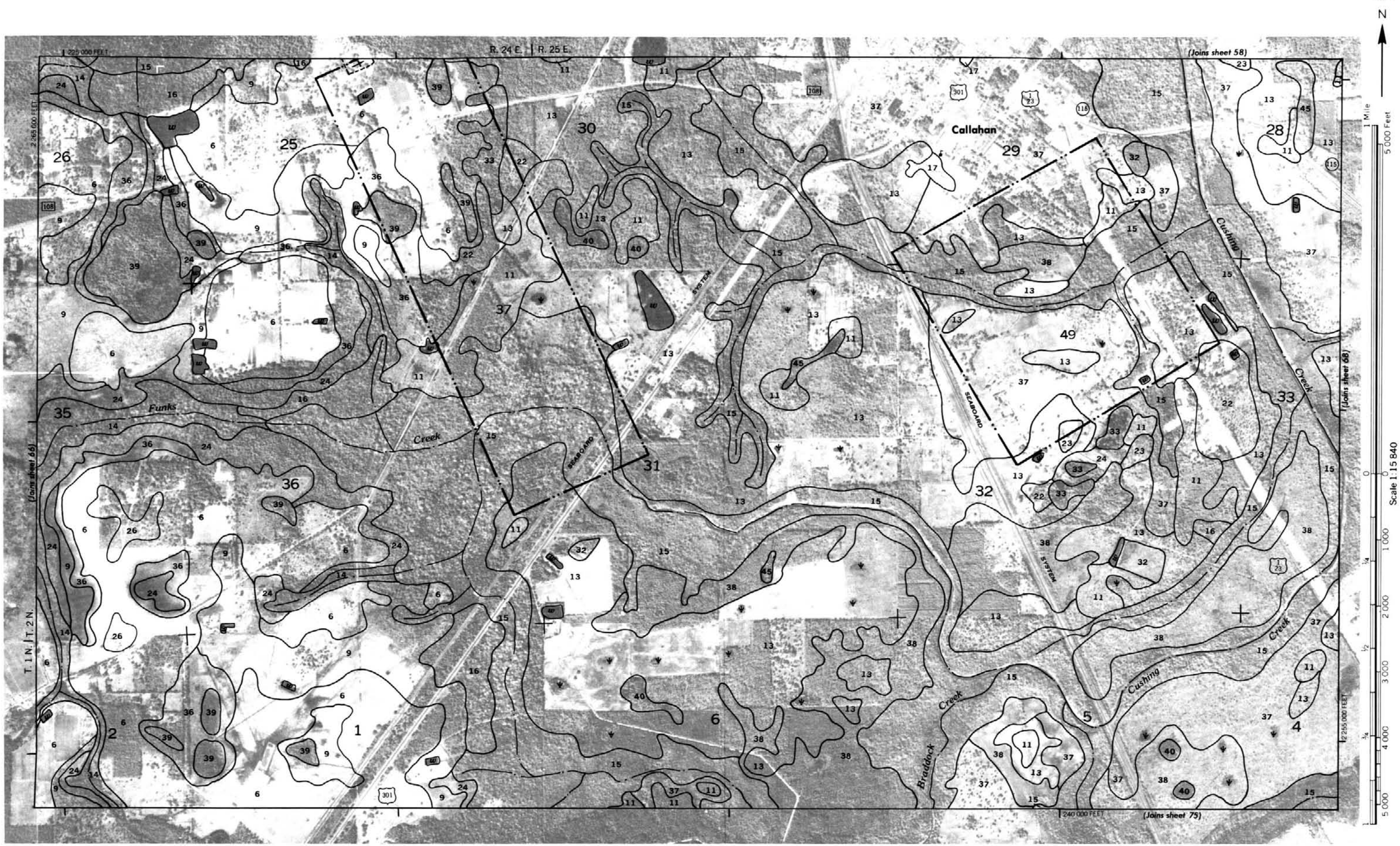

N
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1
1 000
2 000
3 000
4 000
5 000
(Joins sheet 53)
(Joins sheet 61)
(Joins sheet 63)
(Joins sheet 70)
R. 27 E.
T. 2 N.
320 000 FEET
305 000 FEET
2 225 000 FEET
2 265 000 FEET
NASSAU RIVER
DUVAL COUNTY
NASSAU
DUVAL
COUNTY
RIVER
Lumber Creek
SEABOARD SYSTEM
17
Creek
Gardner
Cuno
Creek
Lofton Creek
Lofton
Creek
water
w
42
43
6
7
9
10
14
16
18
20
21
22
26
27
28
39
51

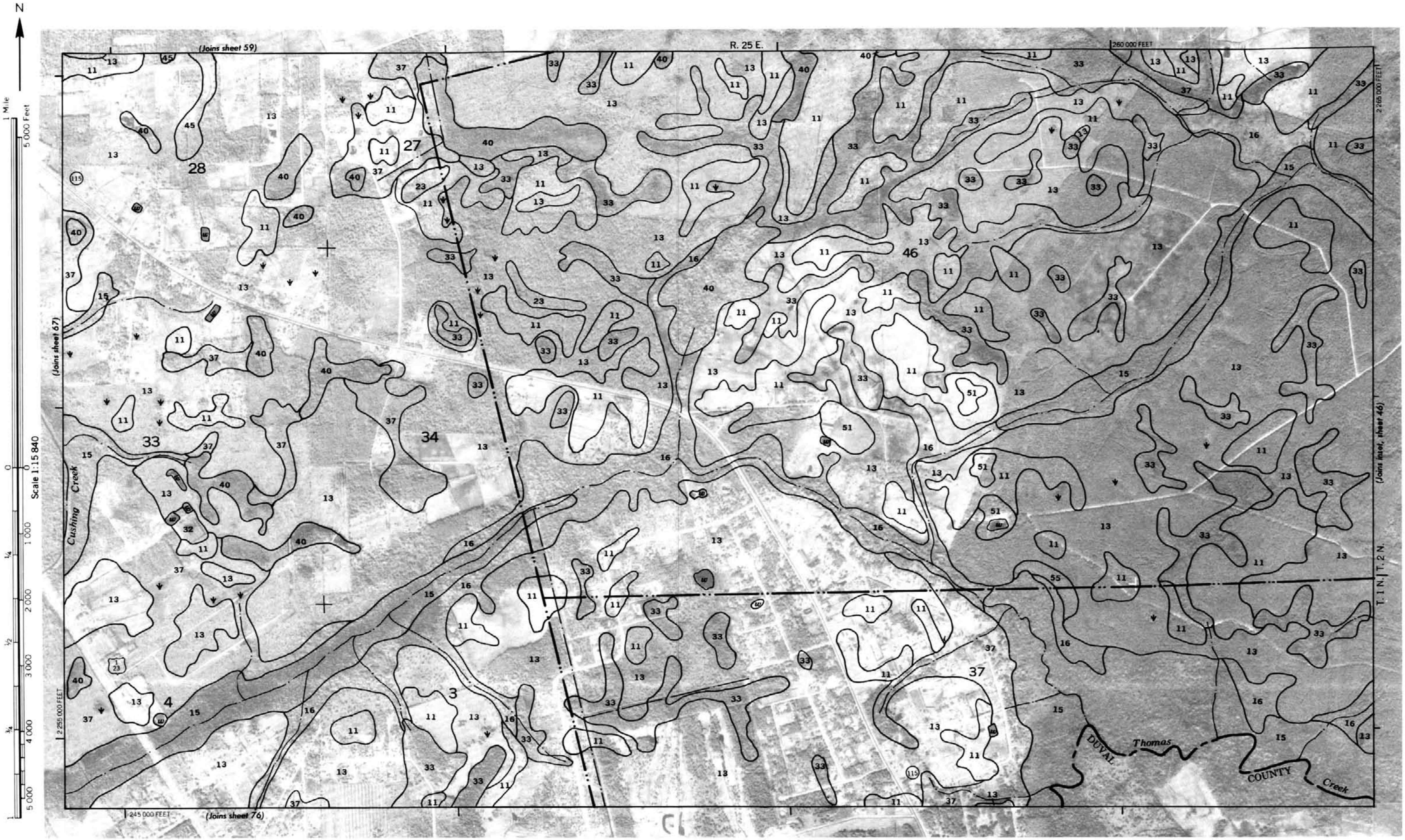

N
R. 27 E. | R. 28 E.
325 000 FEET
(Joins sheet 54)
2 275 000 FEET
T. 2 N.
(Joins sheet 62)
(Joins sheet 64)
(Joins sheet 71)
340 000 FEET
2 265 000 FEET
Homer Landing
Lofton Creek
water
Nassauville
NASSAU RIVER
DUVAL COUNTY
107
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1
0
1 000
2 000
3 000
4 000
5 000

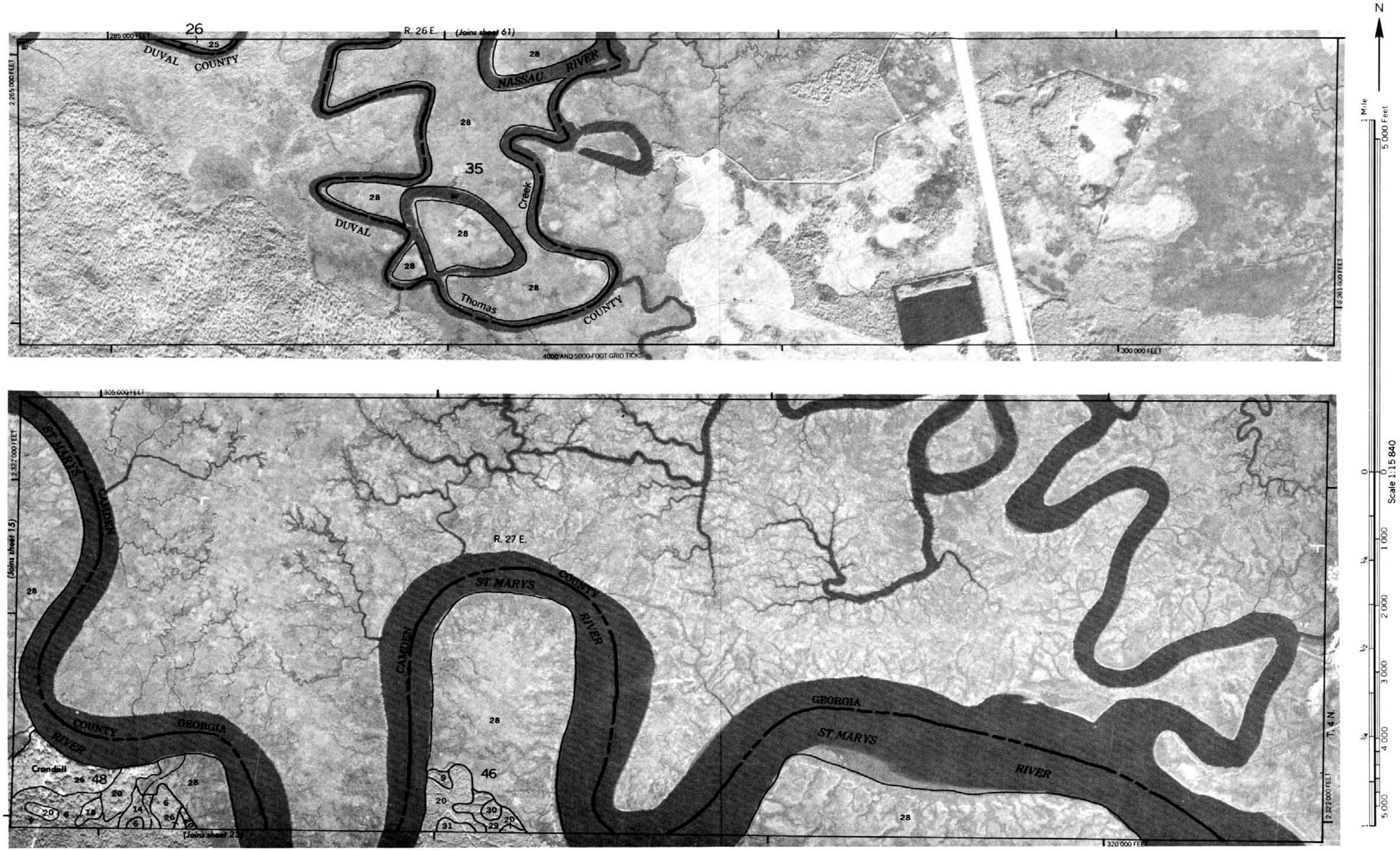

N
1 Mile
5 000 Feet
0
1/4
1/2
3/4
1
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
(Joins sheet 55)
(Joins sheet 63)
(Joins sheet 72)
360 000 FEET
2 275 000 FEET
2 265 000 FEET
345 000 FEET
INTERCOASTAL WATERWAY
INTERCOASTAL WATERWAY
Alligator Creek
Alligator Creek
Alligator Creek
Creek
Harrison Creek
SOUTH AMELIA RIVER
Amelia City
AMELIA ISLAND
American Beach
Seymour Point
ATLANTIC OCEAN
105
A1A
A1A
2
14
9
19
9
19
28
19
9
19
28
28
28
28
28
28
28
28
28
28
28
28
28
28
28
28
28
6
29
8
10
4
29
9
6
9
18
18
18
10
8
10
4
10
6
26
12
3
5
10
4
8
29
18
10
20
18
29
12
27
18
10
25
3
5
9
W
10
25
20
27
31
20
19

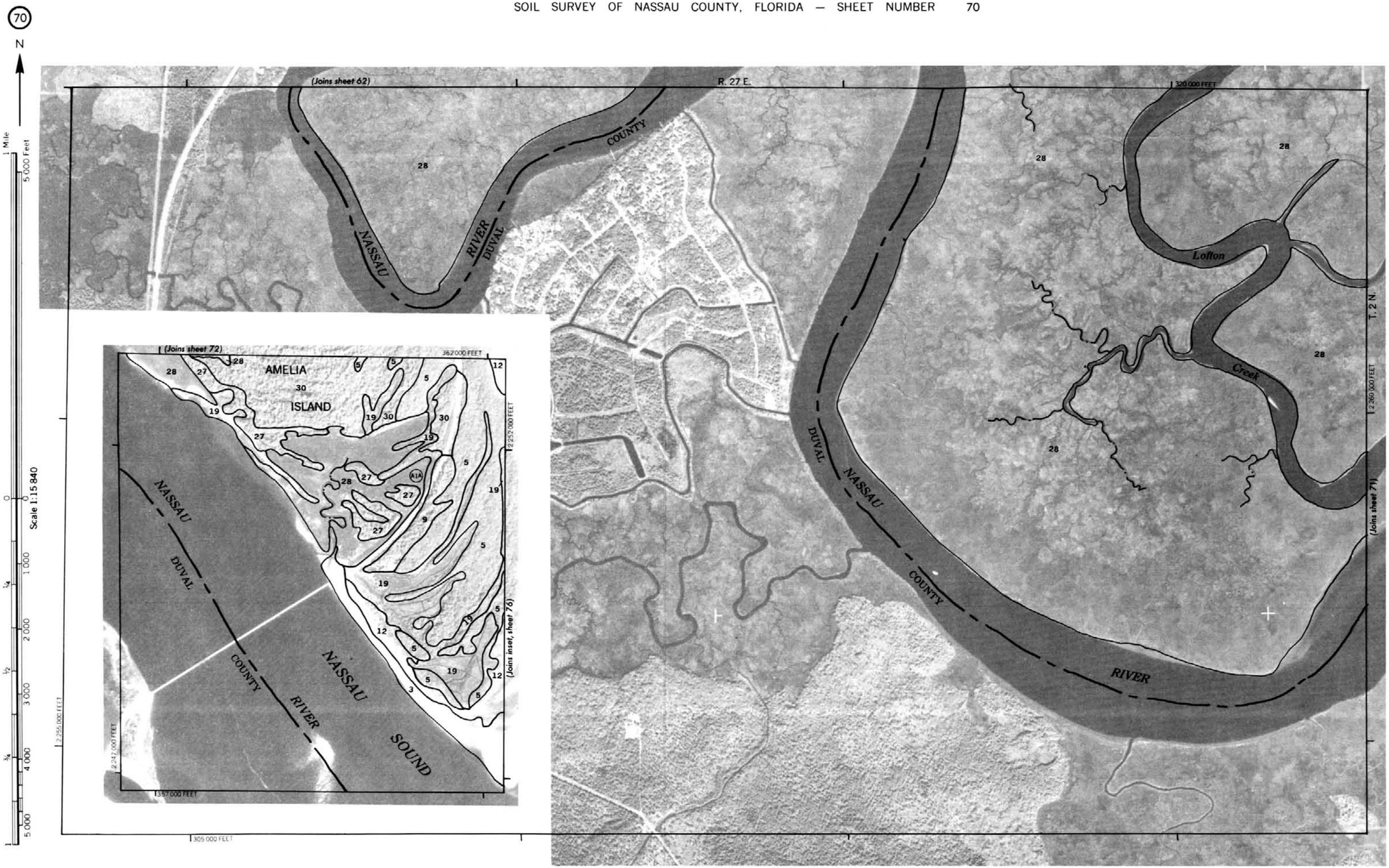

N
R. 23 E. | R. 24 E.
(Joins sheet 56)
190 000 FEET
2 260 000 FEET
(Joins sheet 66)
(Joins inset, sheet 90)
(Joins sheet 73)
200 000 FEET
2 255 000 FEET
T. 1 N. | T. 2 N.
121
108
Mill
Creek
27
26
25
30
34
35
36
31
3
2
1
6
1 Mile
5 000 Feet
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
Scale 1:15 840

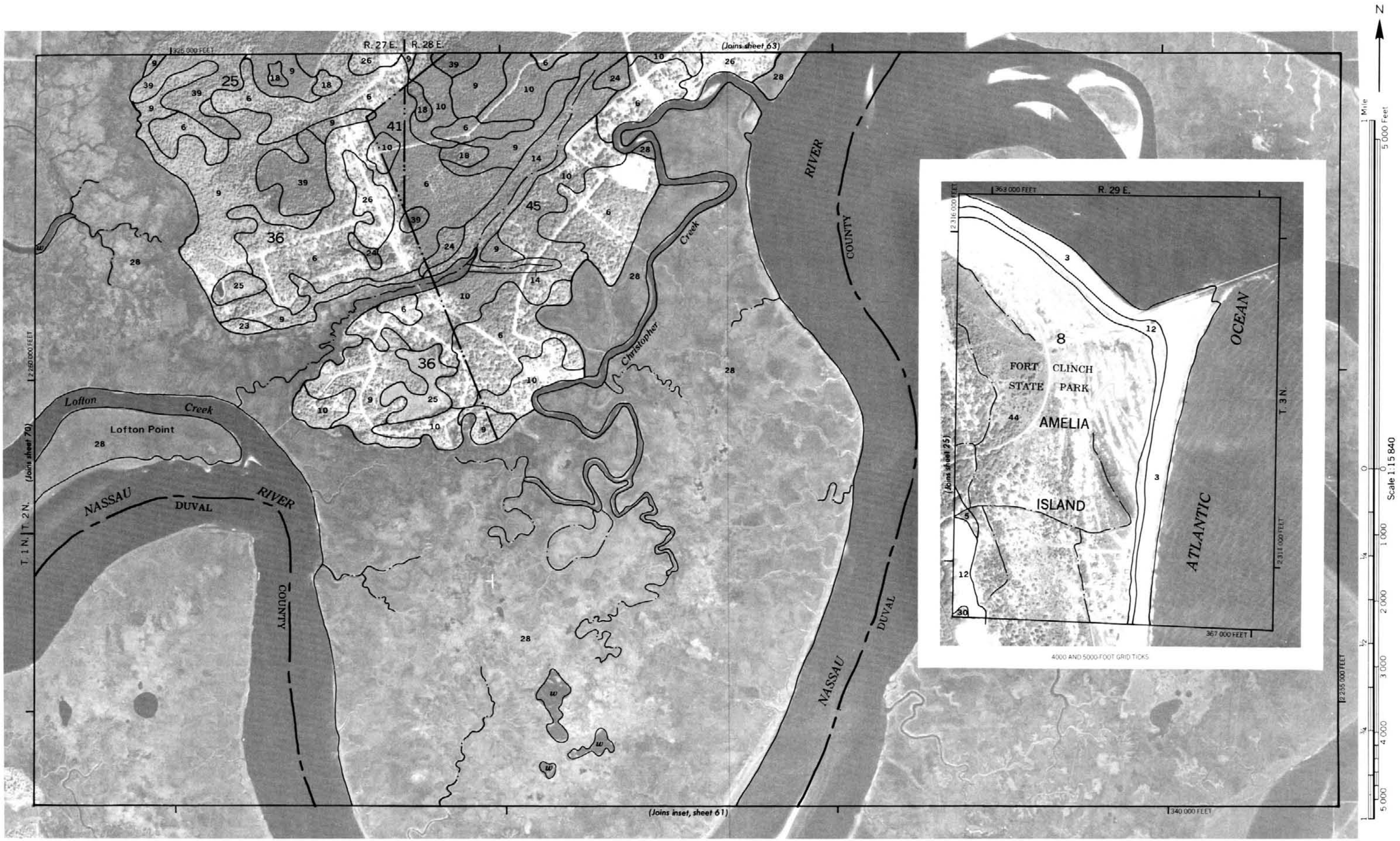

N
(Joins sheet 57)
R. 24 E.
220 000 FEET
(Joins sheet 65)
(Joins sheet 67)
(Joins sheet 74)
205 000 FEET
2 255 000 FEET
T. 1 N. | T. 2 N.
Funks Creek
108
29
30
31
32
33
34
35
28
27
26
2
3
4
5
6
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1 000
2 000
3 000
4 000
5 000

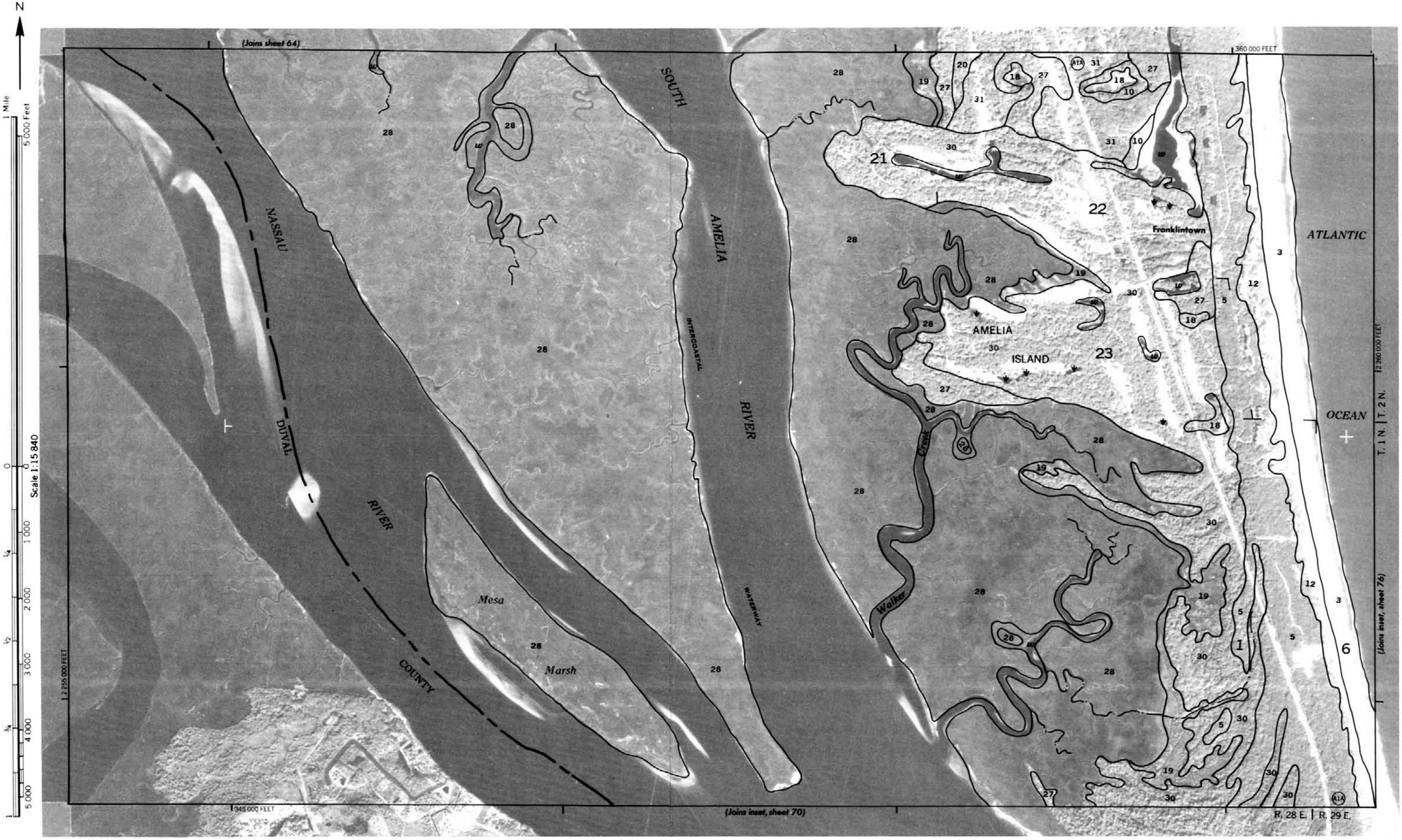

67
N
(Joins sheet 58)
(Joins sheet 68)
(Joins sheet 75)
(Joins sheet 56)
R. 24 E. | R. 25 E.
T. 1 N. | T. 2 N.
225 000 FEET
2 265 000 FEET
240 000 FEET
2 255 000 FEET
Callahan
Funks Creek
Cushing Creek
Braddock Creek
SEABOARD SYSTEM
1 Mile
5 000 Feet
Scale 1:15 840

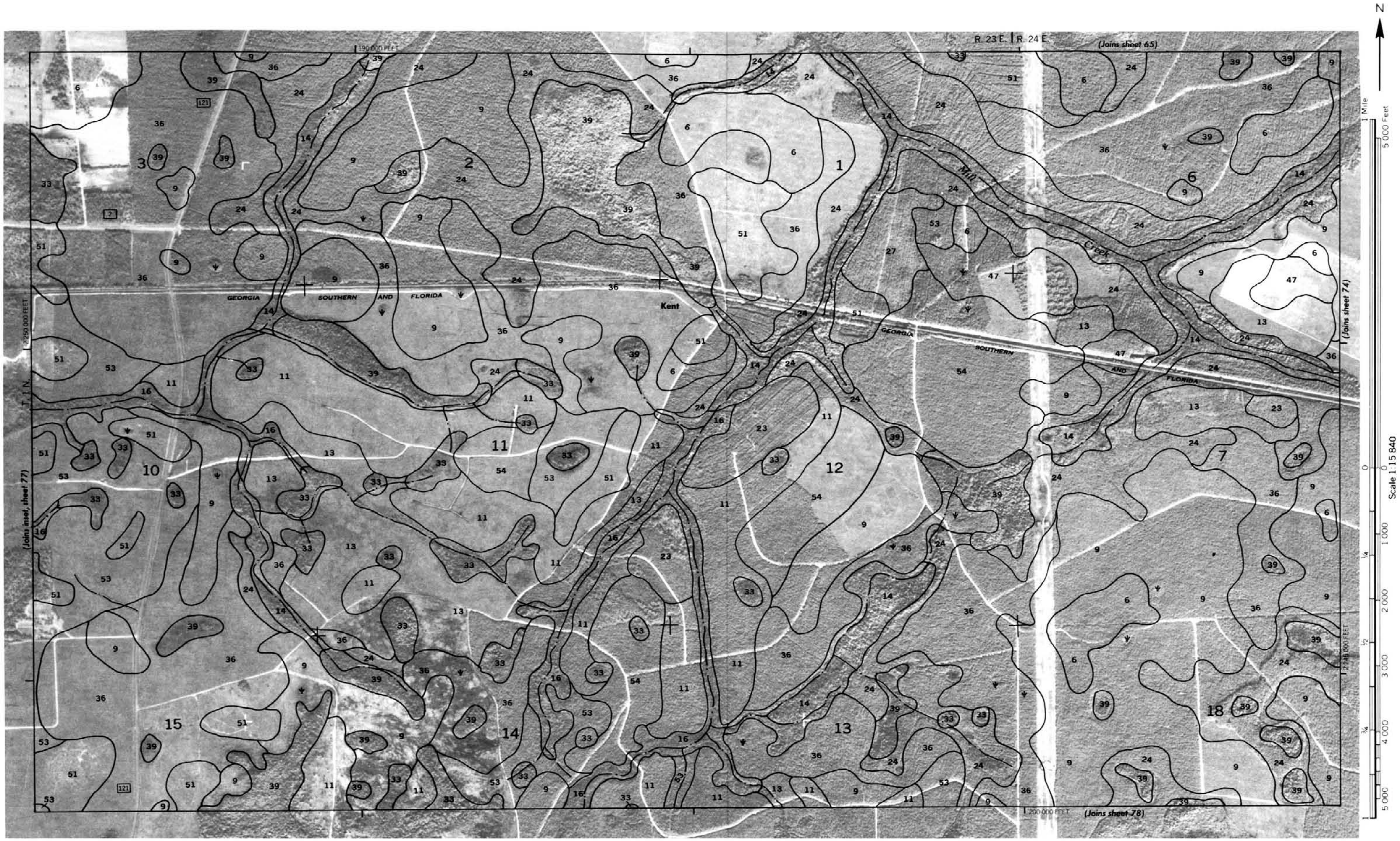

N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 59)
R. 25 E.
260 000 FEET
2 265 000 FEET
(Joins sheet 67)
(Joins inset, sheet 46)
T. 1 N. | T. 2 N.
2 255 000 FEET
245 000 FEET
(Joins sheet 76)
Cushing Creek
Thomas Creek
DUVAL COUNTY
28
27
33
34
46
4
3
37
115
23


N
285 000 FEET
26
25
R. 26 E.
(Joins sheet 61)
DUVAL
COUNTY
NASSAU
RIVER
28
35
Creek
Thomas
COUNTY
DUVAL
w
2 265 000 FEET
2 281 000 FEET
4000 AND 5000-FOOT GRID TICKS
300 000 FEET
305 000 FEET
2 327 000 FEET
(Joins sheet 15)
ST MARYS
CAMDEN
COUNTY
GEORGIA
RIVER
R. 27 E.
ST MARYS
COUNTY
RIVER
CAMDEN
GEORGIA
ST MARYS
RIVER
Crandall
48
46
20
6
14
26
9
30
31
29
(Joins sheet 23)
T. 4 N.
2 322 000 FEET
320 000 FEET
1 Mile
5 000 Feet
0
¼
½
¾
1
0
1 000
2 000
3 000
4 000
5 000
Scale 1:15 840

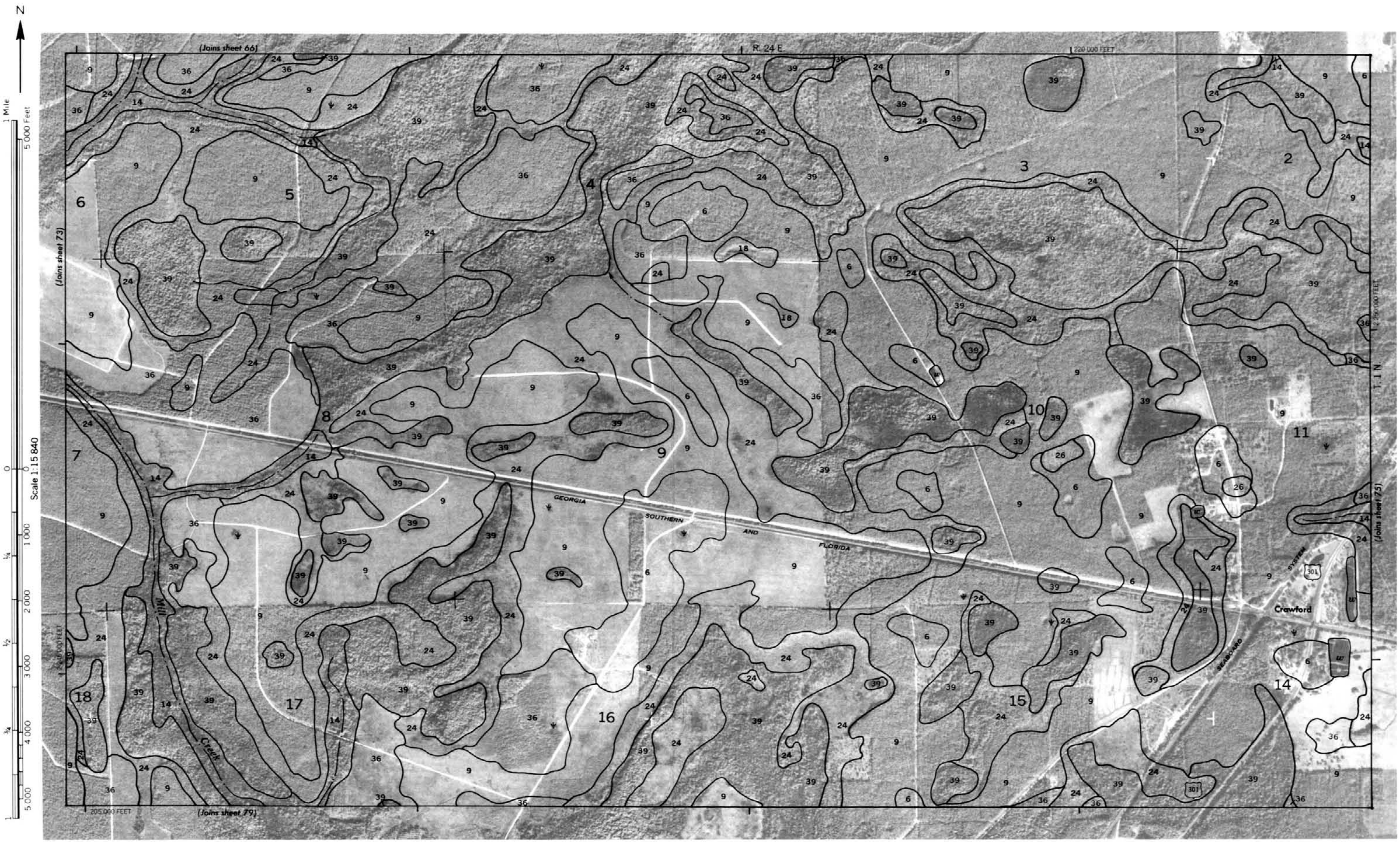

70
N
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
(Joins sheet 62)
R. 27 E.
320 000 FEET
T. 2 N.
2 260 000 FEET
(Joins sheet 71)
305 000 FEET
2 255 000 FEET
NASSAU
RIVER
DUVAL
COUNTY
Lofton
Creek
28
(Joins sheet 72)
362 000 FEET
2 252 000 FEET
2 247 000 FEET
357 000 FEET
(Joins inset, sheet 76)
AMELIA
ISLAND
NASSAU SOUND
A1A
3
5
9
12
19
27
28
30

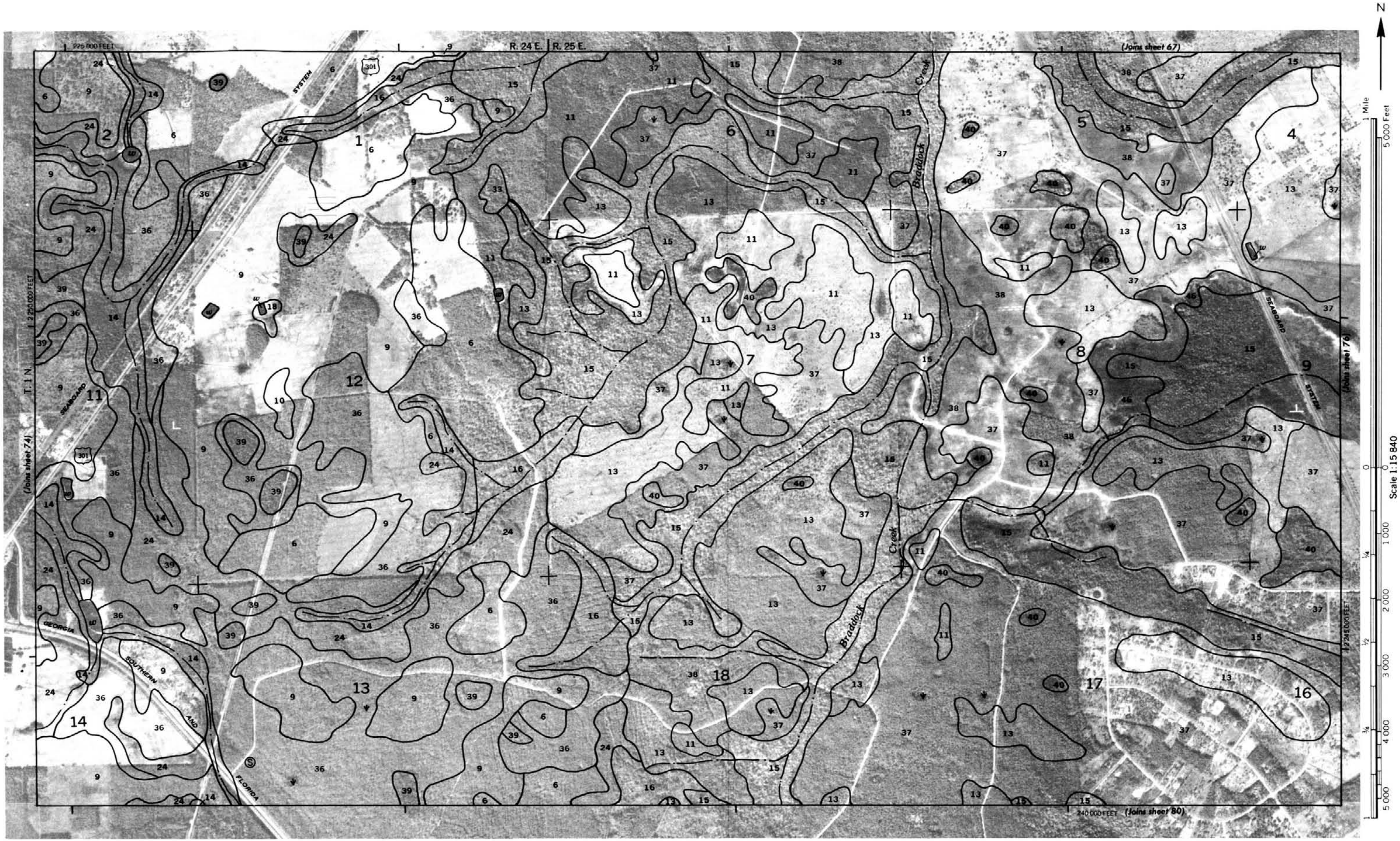

N
R. 27 E.
R. 28 E.
325 000 FEET
(Joins sheet 63)
(Joins sheet 70)
(Joins inset, sheet 61)
340 000 FEET
2 260 000 FEET
2 255 000 FEET
T. 2 N.
T. 1 N.
Lofton Creek
Lofton Point
Christopher Creek
NASSAU RIVER
DUVAL
NASSAU
COUNTY
RIVER
NASSAU COUNTY
DUVAL
R. 29 E.
363 000 FEET
367 000 FEET
2 316 000 FEET
2 311 000 FEET
T. 3 N.
(Joins sheet 25)
FORT CLINCH STATE PARK
AMELIA ISLAND
ATLANTIC OCEAN
4000 AND 5000-FOOT GRID TICKS
1 Mile
5 000 Feet
0
¼
½
¾
1 000
2 000
3 000
4 000
5 000
Scale 1:15 840
3
5
6
8
9
10
12
14
18
23
24
25
26
28
30
36
39
41
44
45
w

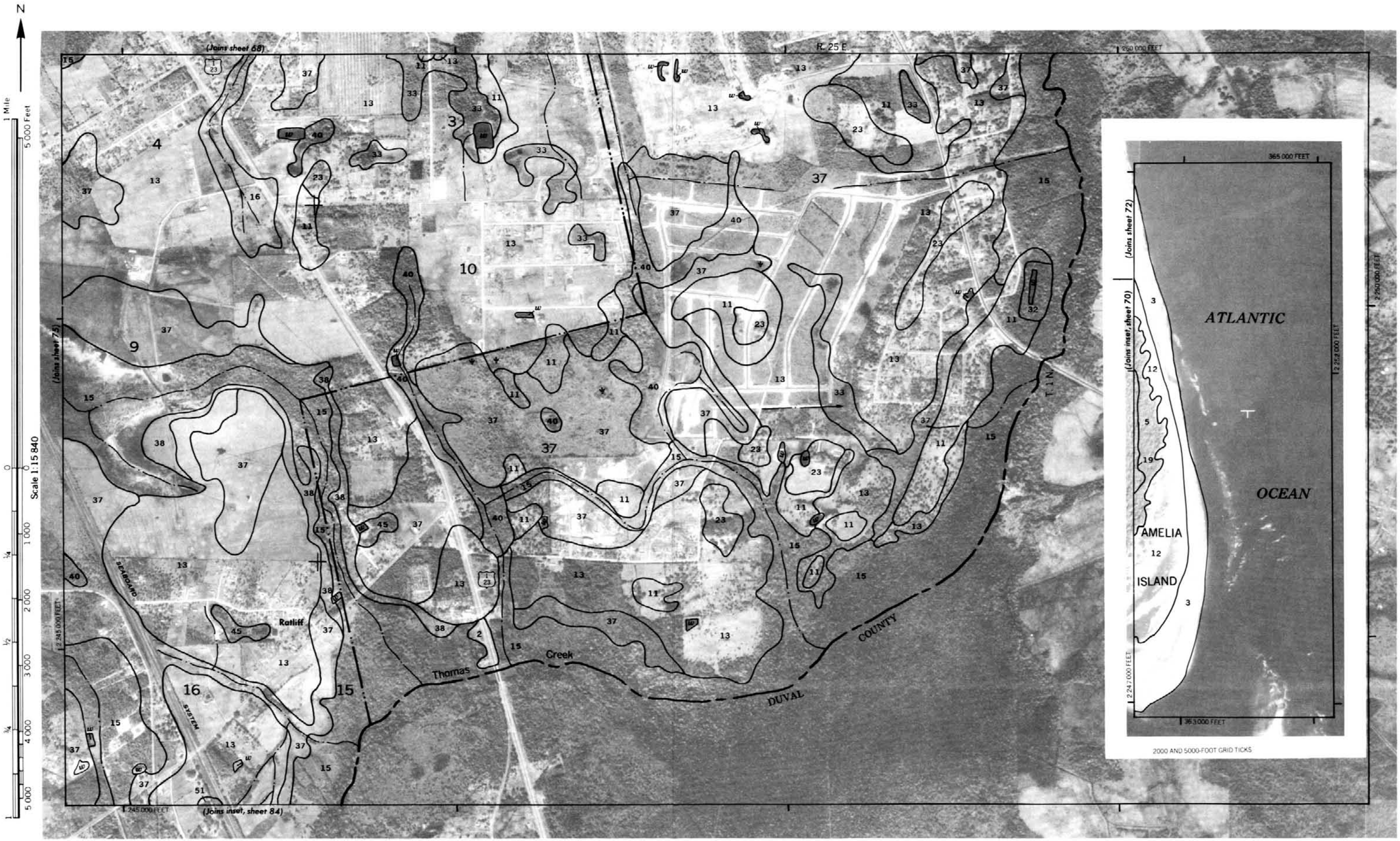

N
1 Mile
5 000 Feet
0
1/4
1/2
3/4
1
0
1 000
2 000
3 000
4 000
5 000
Scale 1:15 840
(Joins sheet 64)
(Joins inset, sheet 70)
(Joins inset, sheet 76)
360 000 FEET
345 000 FEET
2 255 000 FEET
2 260 000 FEET
R. 28 E. | R. 29 E.
T. 1 N. | T. 2 N.
NASSAU
RIVER
DUVAL
COUNTY
SOUTH
AMELIA
RIVER
INTERCOASTAL
WATERWAY
Mesa
Marsh
Walker
Creek
AMELIA
ISLAND
Franklintown
ATLANTIC
OCEAN
A1A
w
1
3
5
6
10
12
18
19
20
21
22
23
27
28
30
31

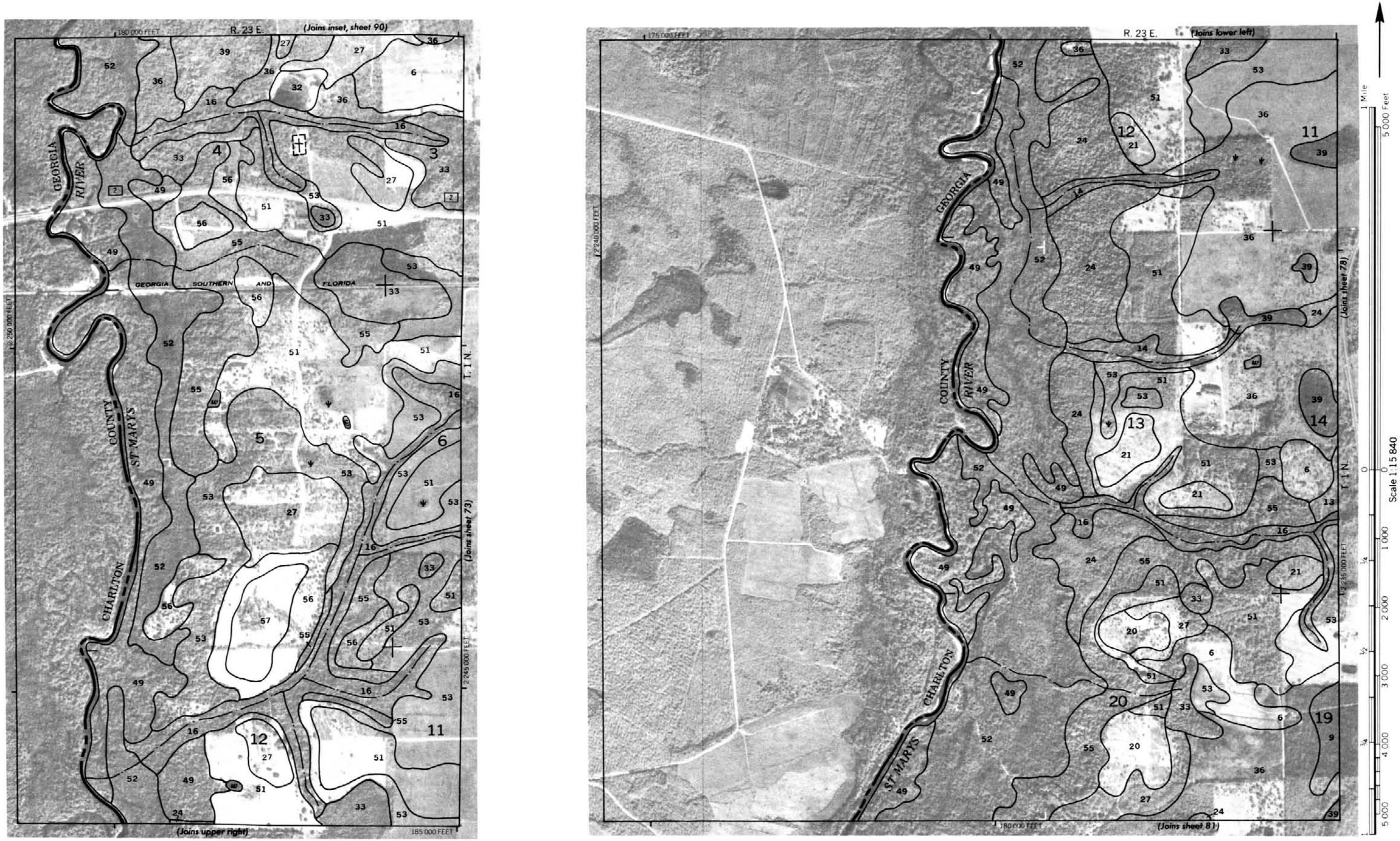

N
R. 23 E.
R. 24 E.
(Joins sheet 65)
(Joins sheet 74)
(Joins sheet 78)
(Joins inset, sheet 77)
T. 1 N.
190 000 FEET
200 000 FEET
250 000 FEET
240 000 FEET
GEORGIA SOUTHERN AND FLORIDA
Kent
Mill Creek
121
Scale 1:15 840
1 Mile
5 000 Feet
0
¼
½
¾
1 000
2 000
3 000
4 000
5 000

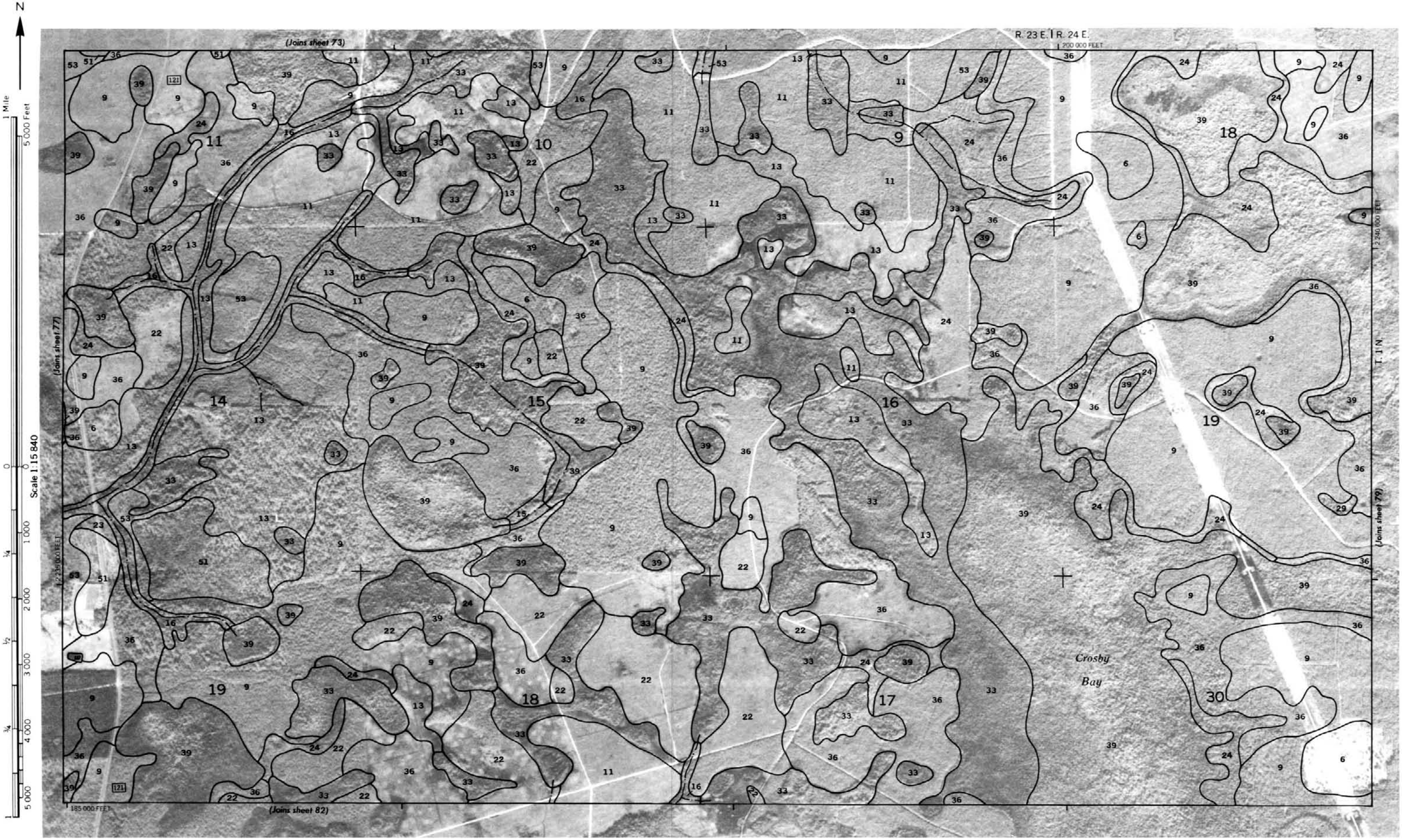
SOIL SURVEY OF NASSAU COUNTY, FLORIDA — SHEET NUMBER 74

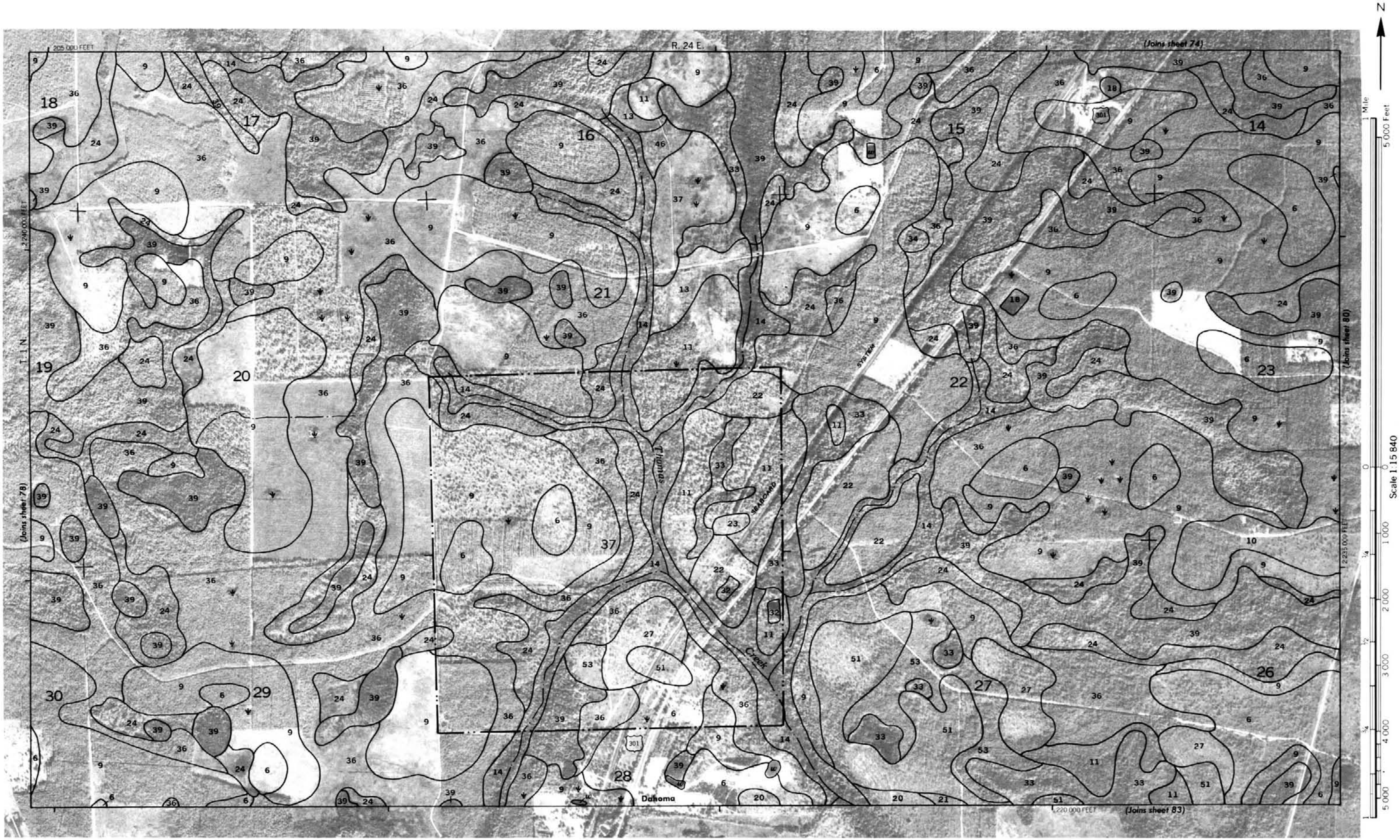

N
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
1 000
2 000
3 000
4 000
5 000
(Joins sheet 66)
R. 24 E.
220 000 FEET
(Joins sheet 73)
(Joins sheet 75)
(Joins sheet 79)
205 000 FEET
2 250 000 FEET
T. 1 N.
GEORGIA
SOUTHERN
AND
FLORIDA
SEABOARD
SYSTEM
Crawford
301
Mill
Creek

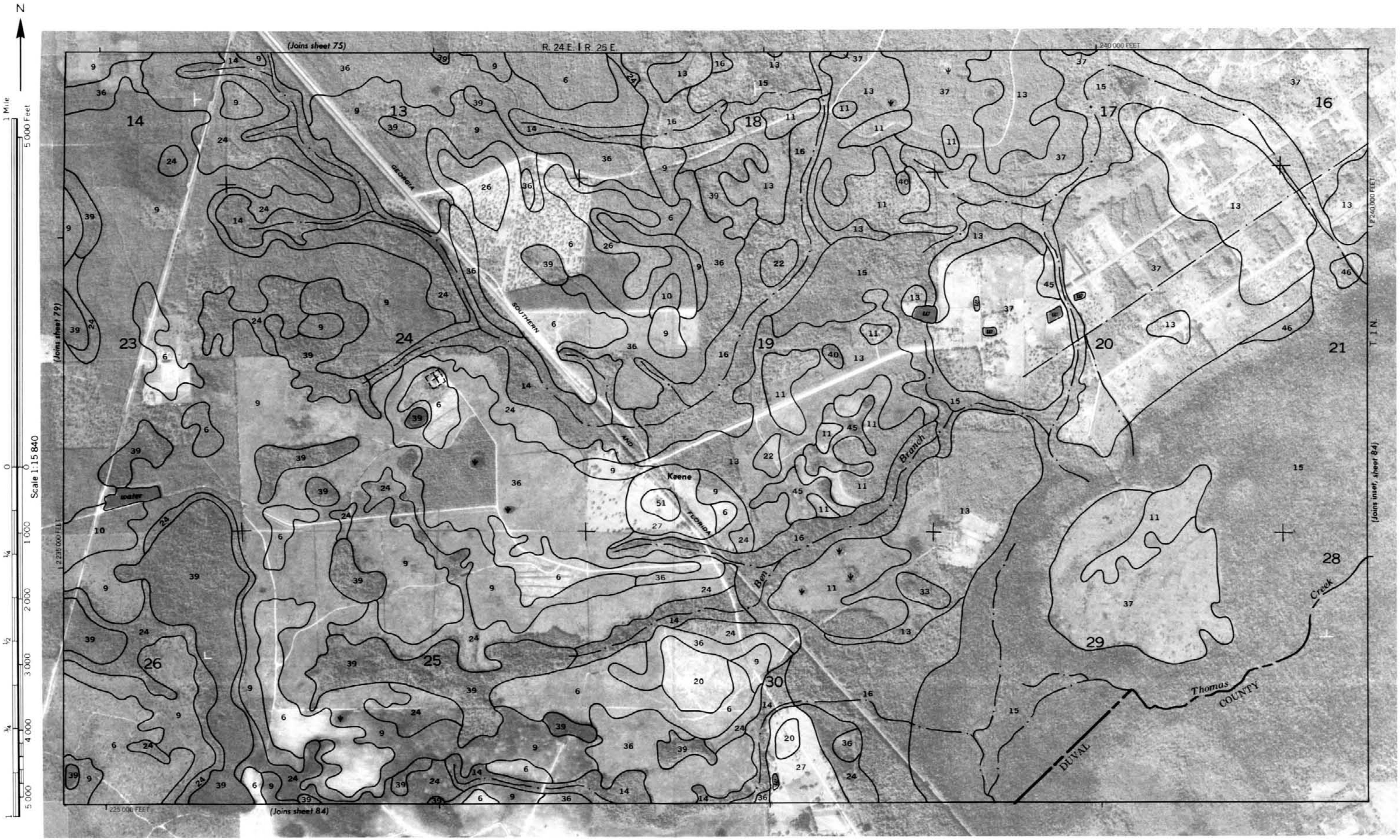

N
225 000 FEET
R. 24 E.
R. 25 E.
(Joins sheet 67)
(Joins sheet 74)
(Joins sheet 76)
240 000 FEET (Joins sheet 80)
2 250 000 FEET
2 245 000 FEET
T. 1 N.
301
SEABOARD SYSTEM
Braddock Creek
GEORGIA SOUTHERN AND FLORIDA
1 Mile
5 000 Feet
0
¼
½
¾
1 000
2 000
3 000
4 000
5 000
Scale 1:15 840

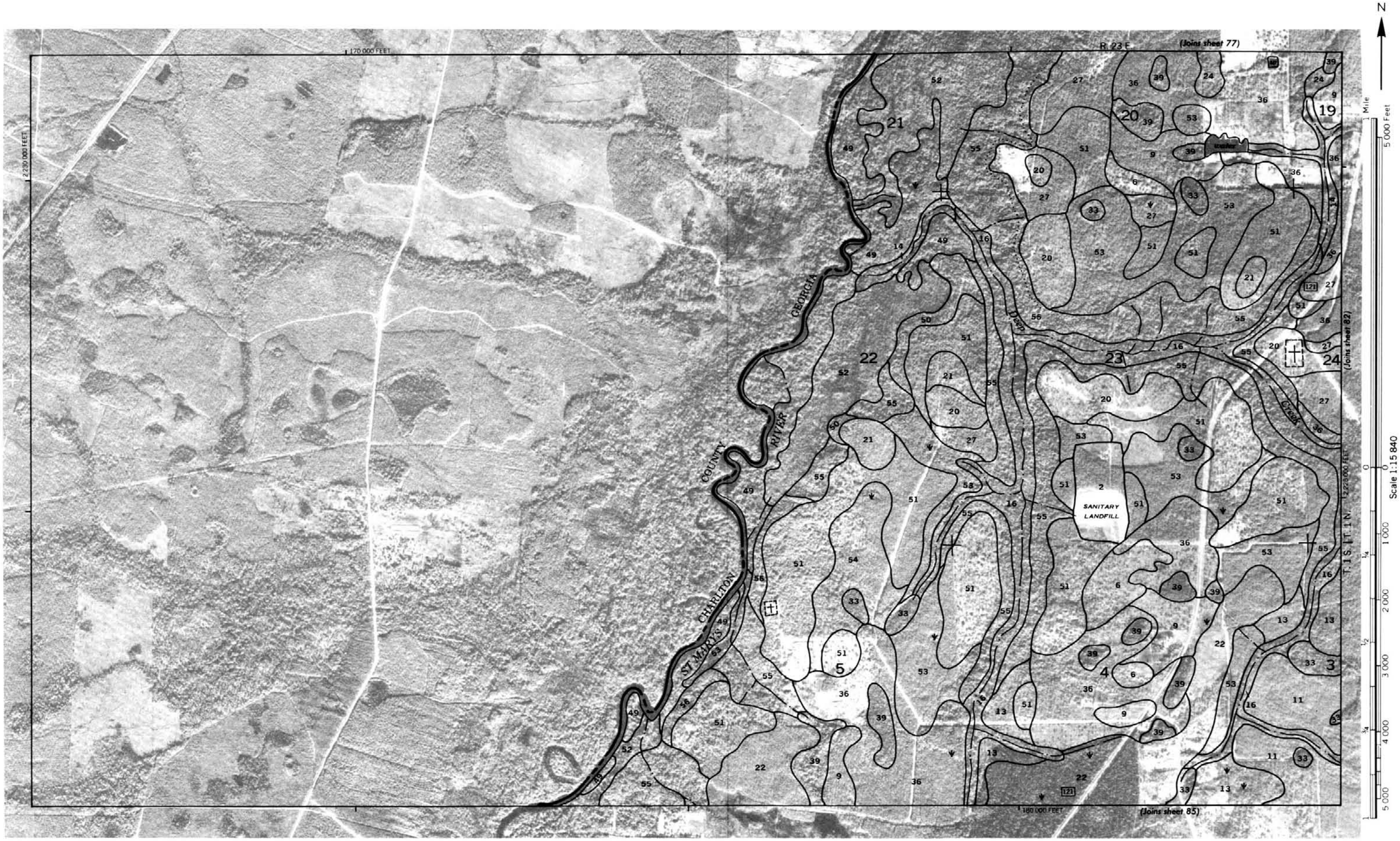

N
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1 000
2 000
3 000
4 000
5 000
(Joins sheet 68)
R. 25 E.
250 000 FEET
2 250 000 FEET
(Joins sheet 75)
2 245 000 FEET
245 000 FEET
(Joins inset, sheet 84)
T. 1 N.
Thomas Creek
DUVAL
COUNTY
SEABOARD
SYSTEM
Ratliff
23
365 000 FEET
(Joins sheet 72)
(Joins inset, sheet 70)
2 252 000 FEET
2 247 000 FEET
363 000 FEET
ATLANTIC
OCEAN
AMELIA
ISLAND
2000 AND 5000-FOOT GRID TICKS

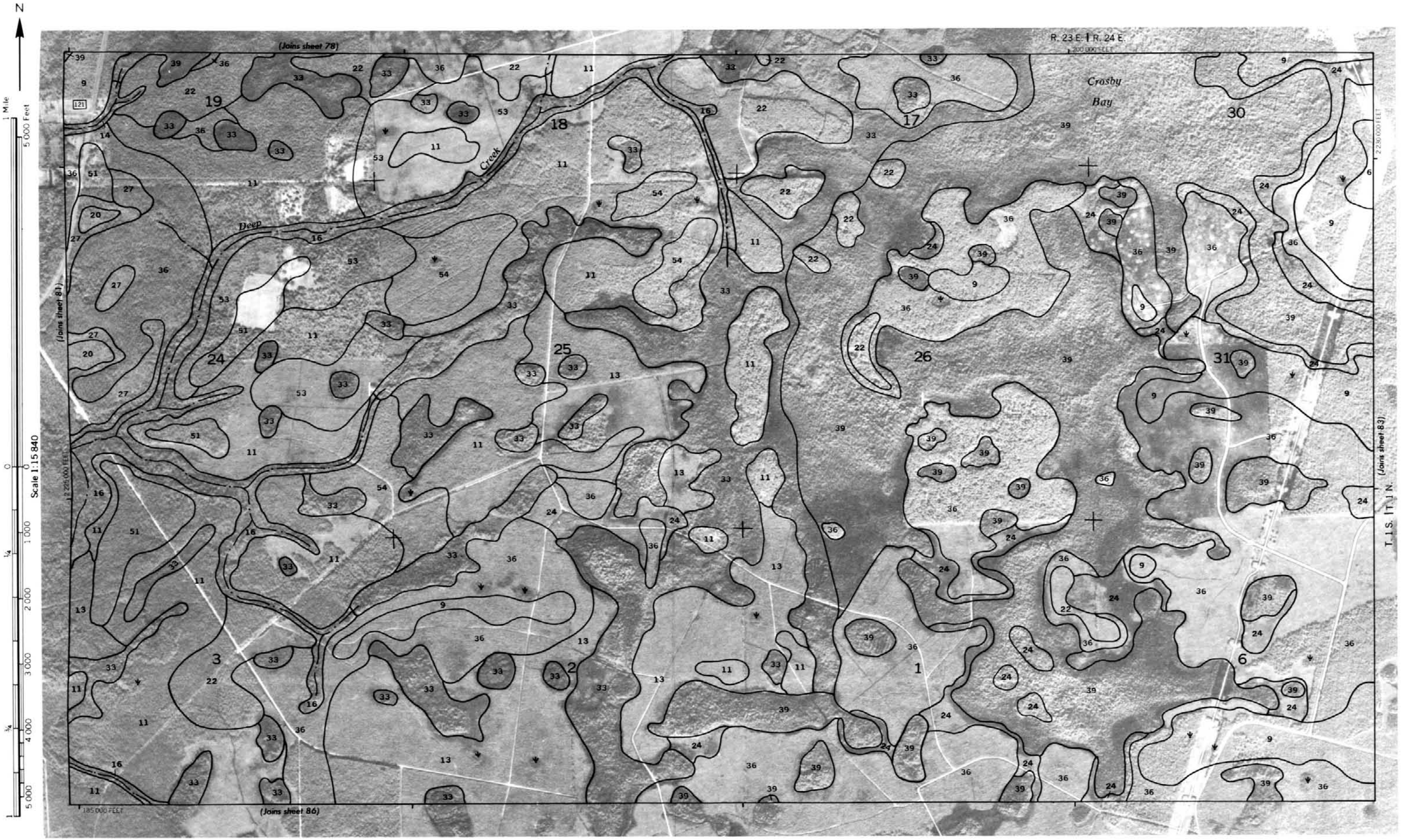

N
R. 23 E.
(Joins inset, sheet 90)
180 000 FEET
(Joins upper right)
185 000 FEET
(Joins sheet 73)
T. 1 N.
2 250 000 FEET
2 245 000 FEET
GEORGIA
RIVER
ST MARYS
COUNTY
CHARLTON
GEORGIA SOUTHERN AND FLORIDA
R. 23 E.
(Joins lower left)
175 000 FEET
180 000 FEET
(Joins sheet 81)
(Joins sheet 78)
2 240 000 FEET
2 235 000 FEET
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1 000
2 000
3 000
4 000
5 000

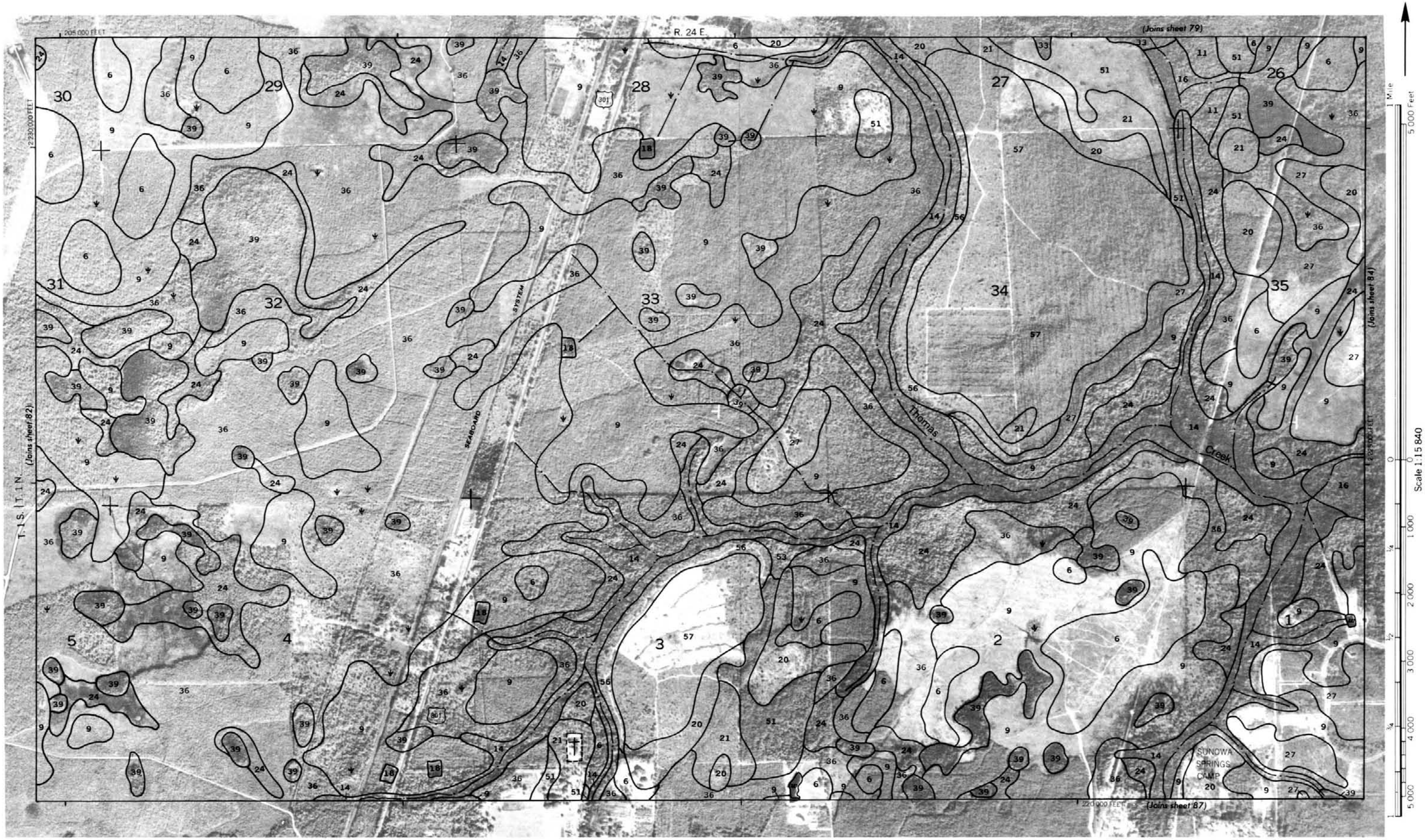

N
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
(Joins sheet 73)
R. 23 E. | R. 24 E.
200 000 FEET
(Joins sheet 77)
(Joins sheet 79)
(Joins sheet 82)
T. 1 N.
2 240 000 FEET
2 236 000 FEET
185 000 FEET
121
Crosby Bay
9
10
11
14
15
16
17
18
19
30


N
205 000 FEET
R. 24 E.
(Joins sheet 74)
2 240 000 FEET
T. 1 N.
(Joins sheet 78)
(Joins sheet 80)
2 235 000 FEET
220 000 FEET
(Joins sheet 83)
Thomas Creek
SEABOARD SYSTEM
301
Dahoma
18
17
16
15
14
19
20
21
22
23
30
29
28
27
26
37
1 Mile
5 000 Feet
0
1/4
1/2
3/4
1 000
2 000
3 000
4 000
5 000
Scale 1:15 840

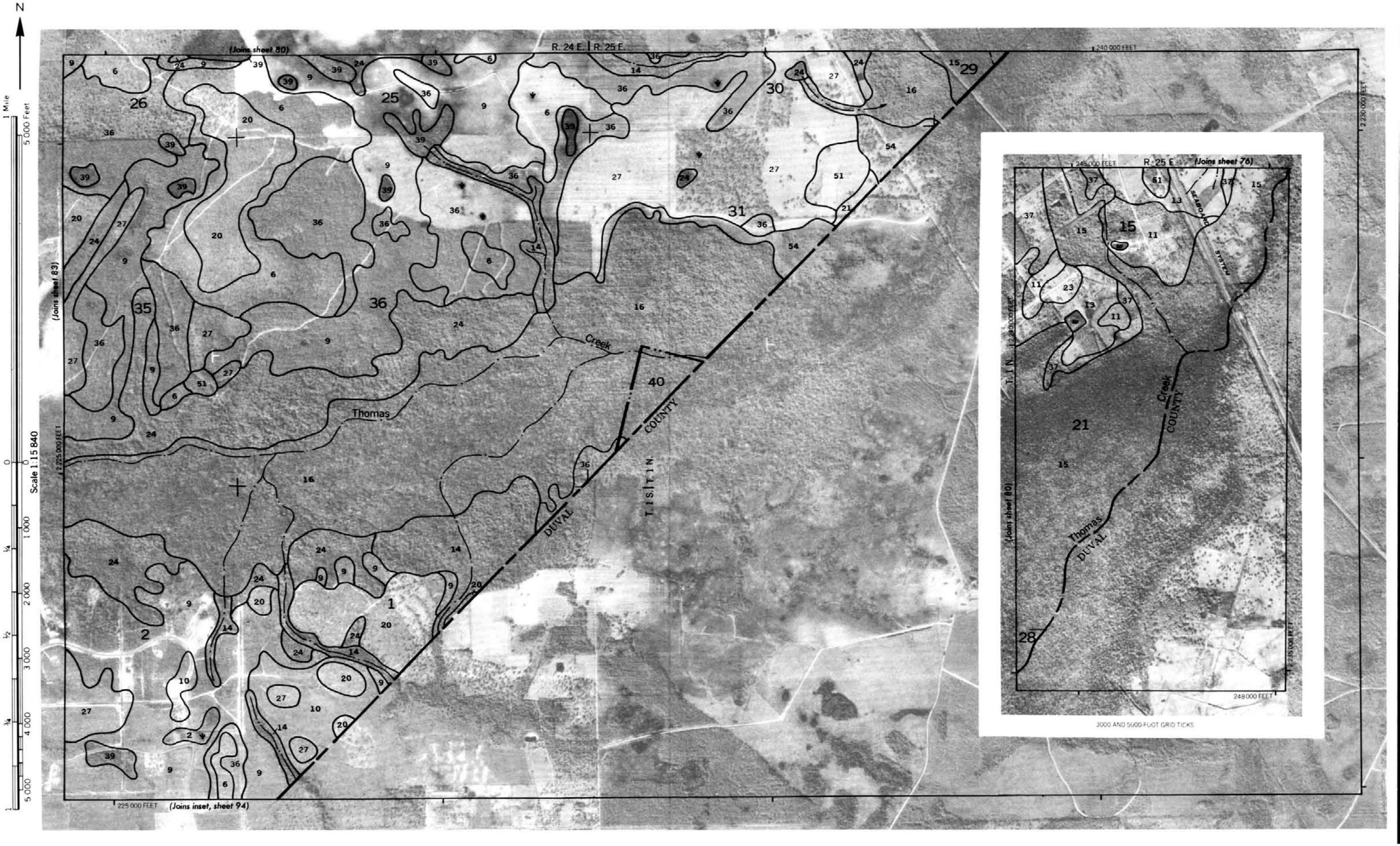

N
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
0
1 000
2 000
3 000
4 000
5 000
(Joins sheet 75)
R. 24 E. | R. 25 E.
240 000 FEET
2 240 000 FEET
T. 1 N.
(Joins inset, sheet 84)
(Joins sheet 79)
2 235 000 FEET
225 000 FEET
(Joins sheet 84)
GEORGIA
SOUTHERN
AND
FLORIDA
Keene
Ben
Branch
Thomas
Creek
DUVAL
COUNTY
water
14
13
16
17
18
23
24
19
20
21
26
25
30
29
28

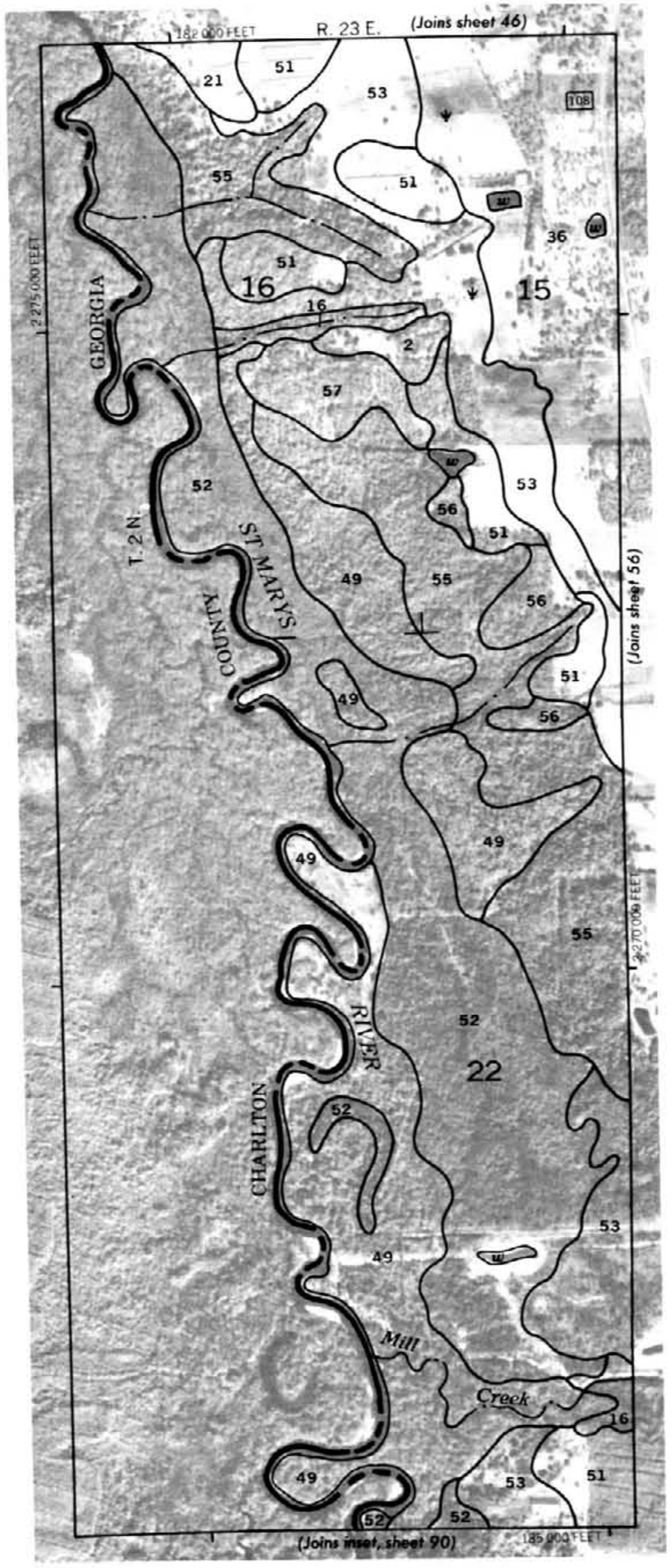

N
R 23 E
(Joins sheet 77)
170 000 FEET
2 230 000 FEET
(Joins sheet 82)
2 220 000 FEET
180 000 FEET
(Joins sheet 85)
T 1 S | T 1 N
GEORGIA
CHARLTON
COUNTY
ST MARYS
RIVER
Deep
Creek
water
SANITARY LANDFILL
121
19
20
21
22
23
24
3
4
5
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾


N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 78)
(Joins sheet 81)
(Joins sheet 83)
(Joins sheet 86)
R. 23 E. | R. 24 E.
200 000 FEET
2 230 000 FEET
2 225 000 FEET
185 000 FEET
T. 1 S. | T. 1 N.
Deep Creek
Crosby Bay
121
19
18
17
30
24
25
26
31
3
2
1
6

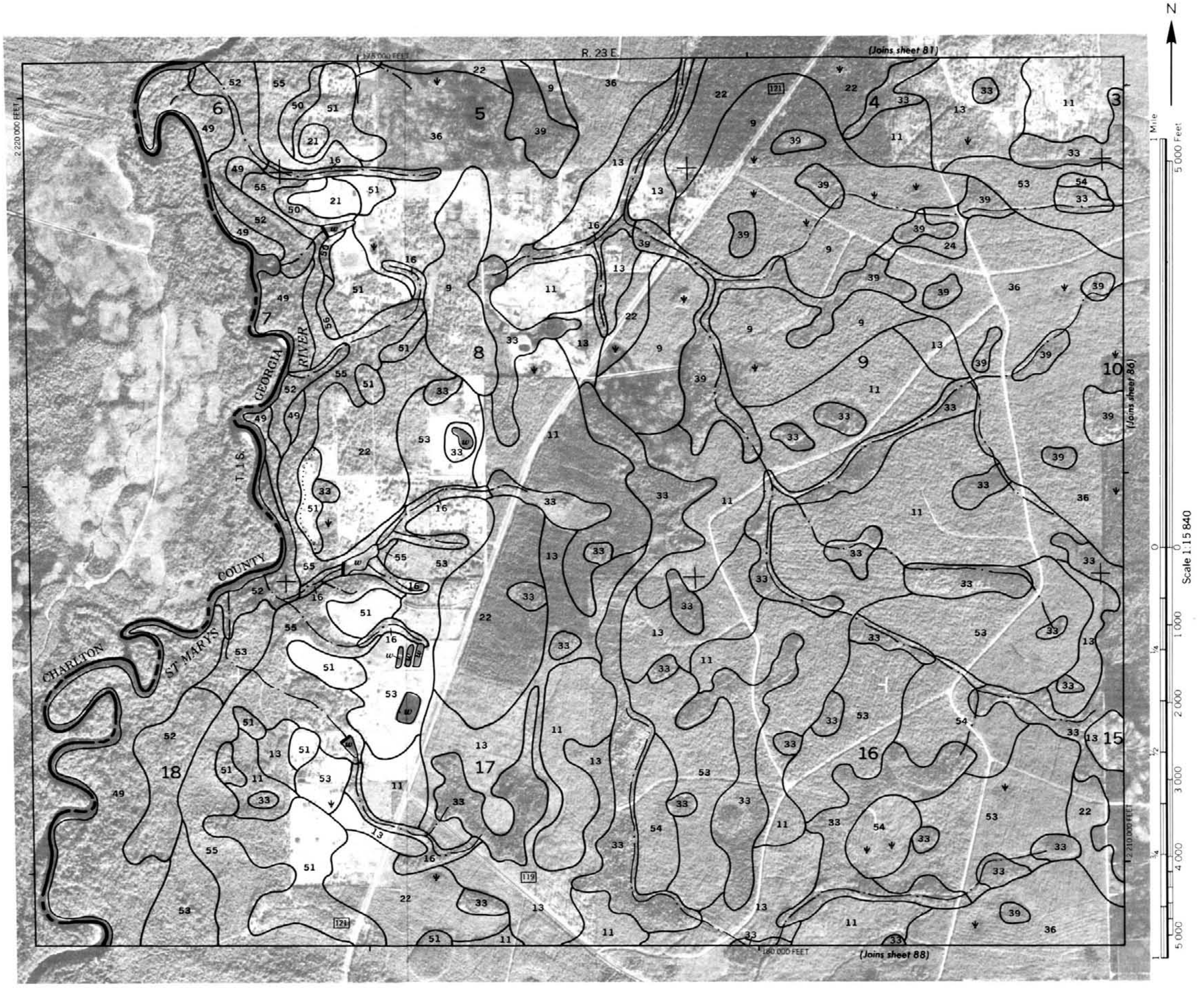


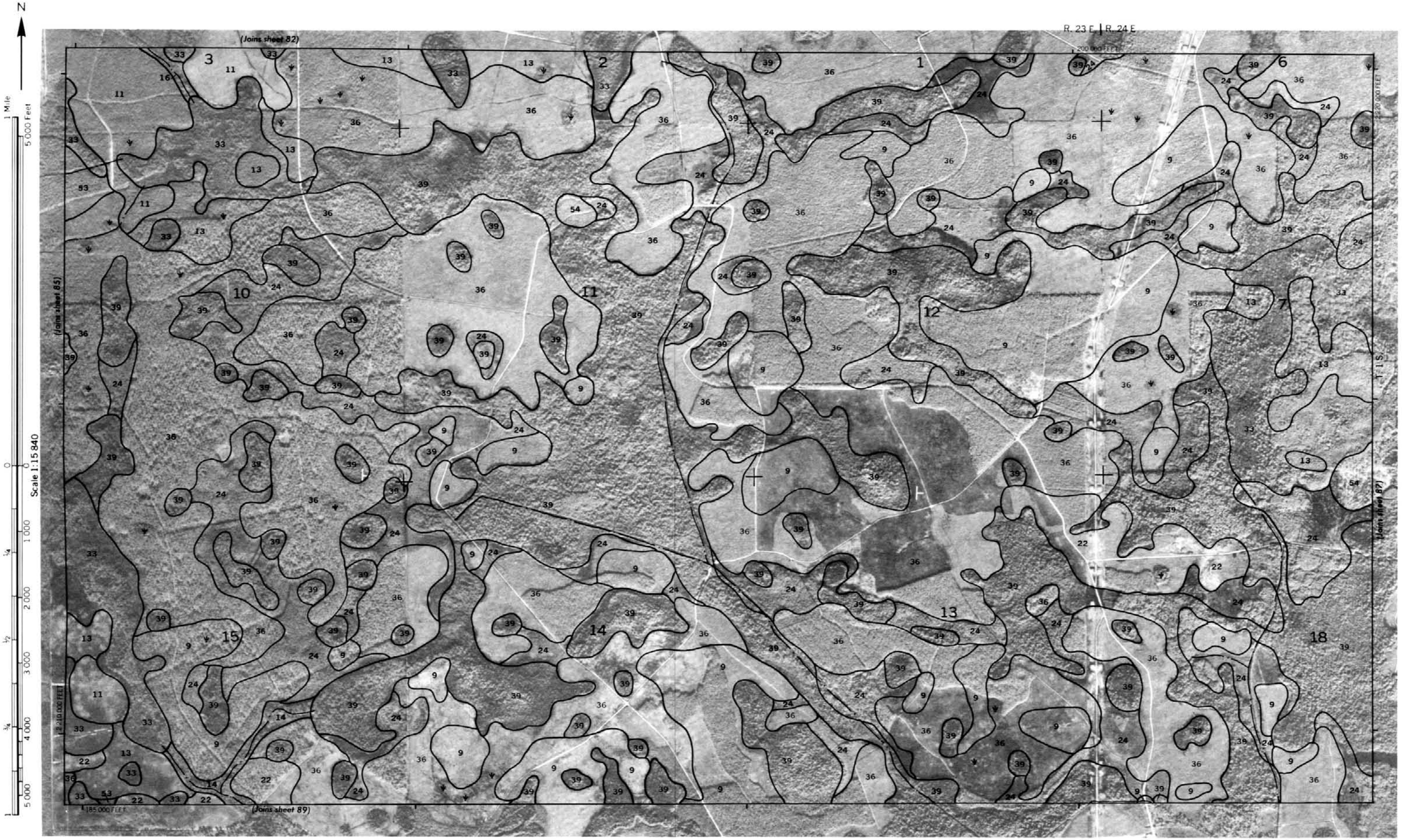
N
(Joins sheet 79)
(Joins sheet 82)
(Joins sheet 84)
(Joins sheet 87)
R. 24 E.
T. 1 S. | T. 1 N.
205 000 FEET
2 230 000 FEET
220 000 FEET
2 225 000 FEET
SEABOARD
SYSTEM
301
Thomas
Creek
SUNOWA SPRINGS CAMP
Scale 1:15 840
1 Mile
5 000 Feet
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾

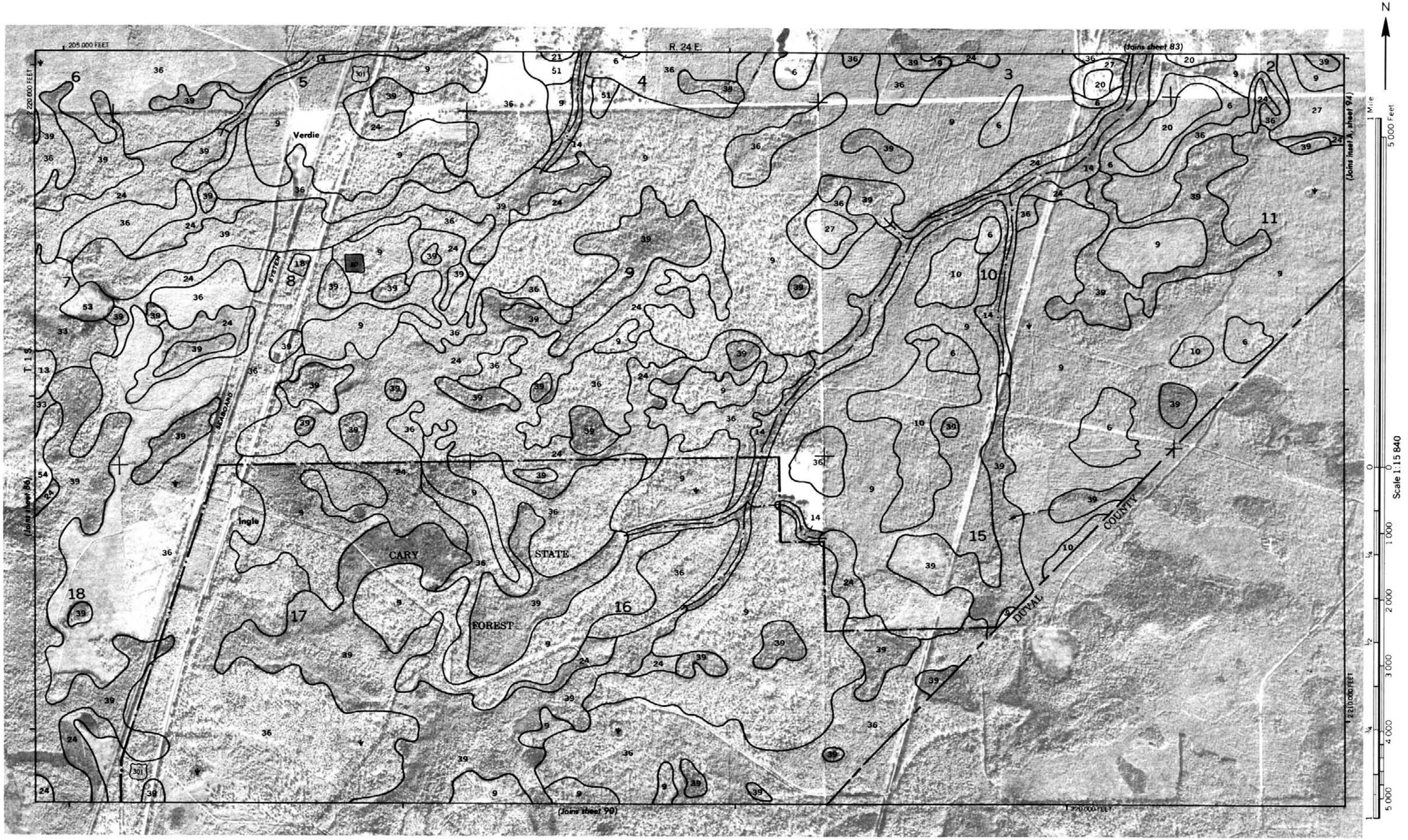

N
1 Mile
5 000 Feet
0
1/4
1/2
3/4
1 000
2 000
3 000
4 000
5 000
Scale 1:15 840
(Joins sheet 80)
R. 24 E. | R. 25 E.
240 000 FEET
2 230 000 FEET
(Joins sheet 83)
2 225 000 FEET
225 000 FEET
(Joins inset, sheet 94)
Thomas Creek
DUVAL COUNTY
T. 1 S. | T. 1 N.
25
26
29
30
31
35
36
40
1
2
248 000 FEET
R. 25 E.
(Joins sheet 76)
SEABOARD SYSTEM
T. 1 N.
2 230 000 FEET
(Joins sheet 80)
Thomas Creek
DUVAL COUNTY
15
21
28
2 235 000 FEET
248 000 FEET
3000 AND 5000-FOOT GRID TICKS


R. 23 E.
(Joins sheet 46)
182 000 FEET
2 275 000 FEET
2 270 000 FEET
185 000 FEET
GEORGIA
T. 2 N.
CHARLTON COUNTY
ST MARYS RIVER
Mill Creek
108
(Joins sheet 56)
(Joins inset, sheet 90)
15
16
22

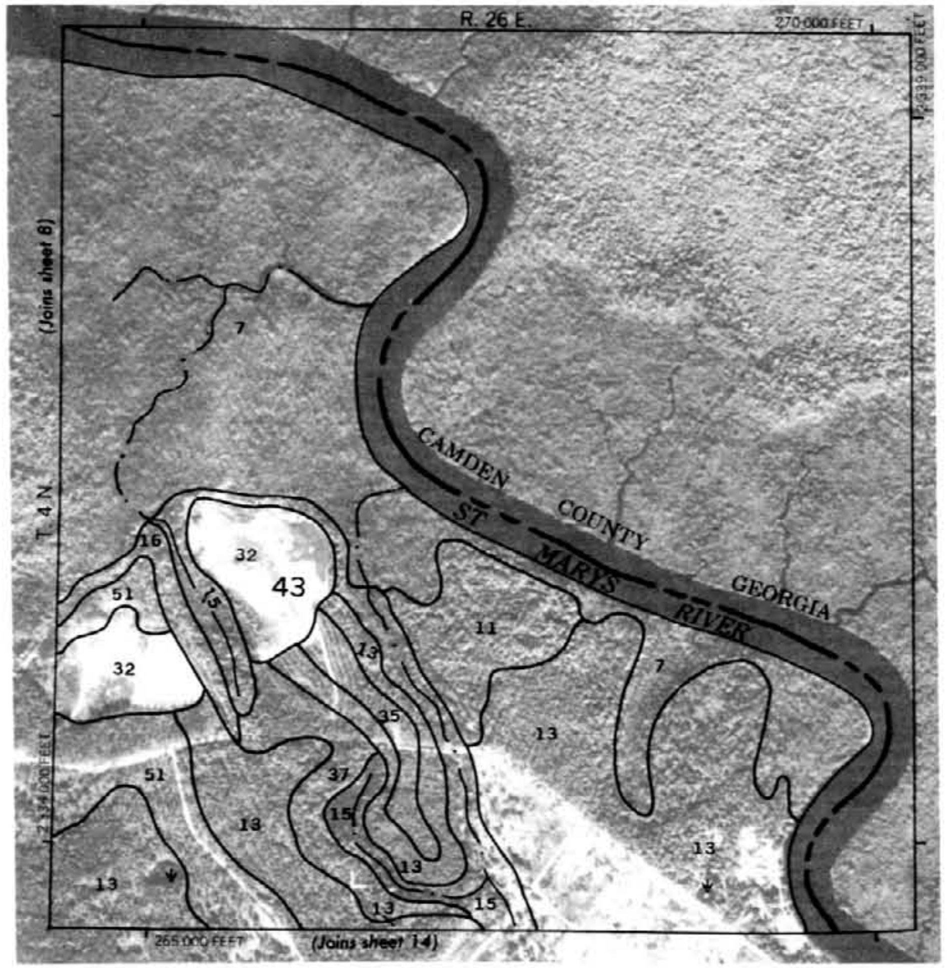
3000 AND 5000-FOOT GRID TICKS

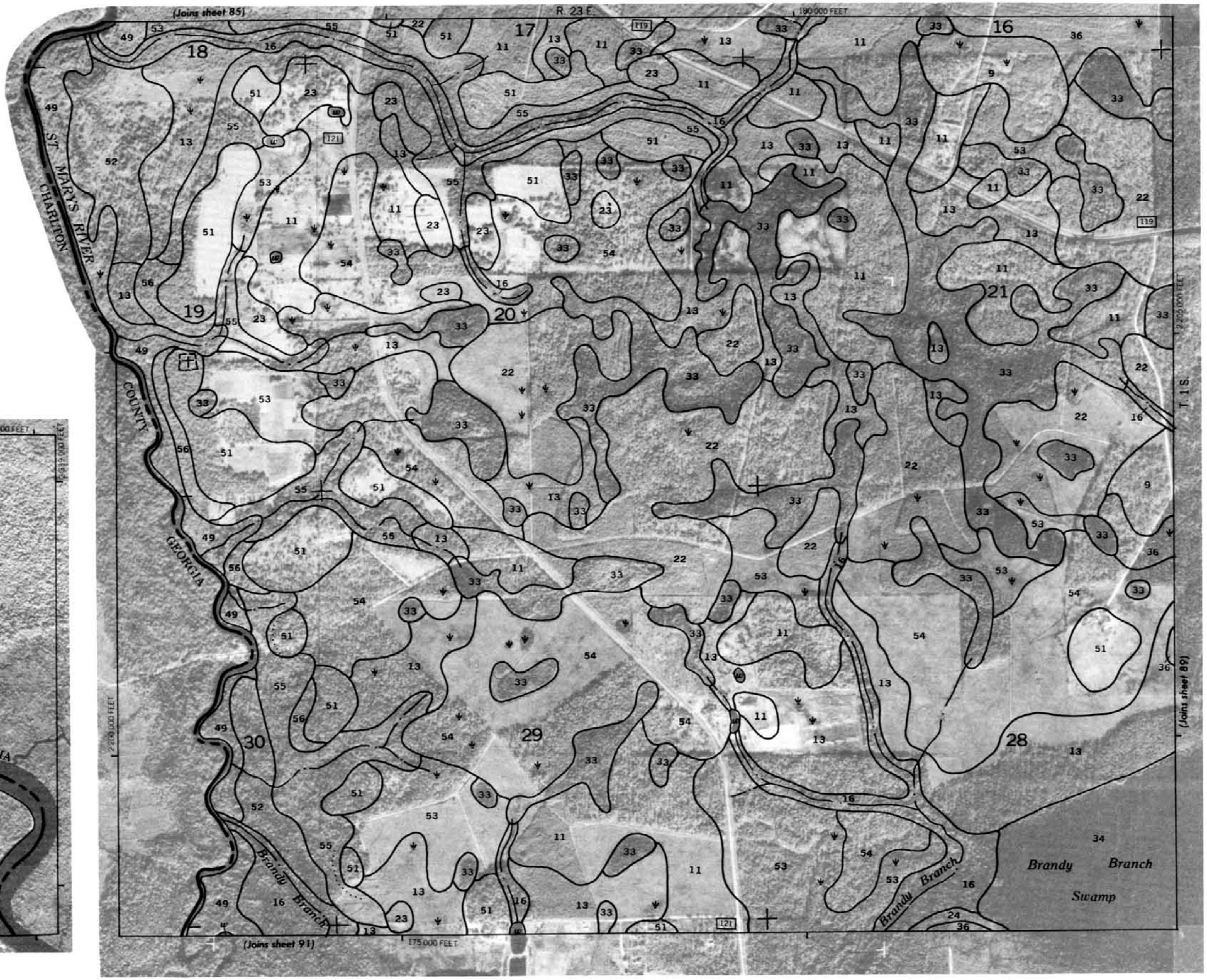

N
R. 23 E.
(Joins sheet 81)
178 000 FEET
2 220 000 FEET
2 210 000 FEET
180 000 FEET
GEORGIA
T. 1 S.
CHARLTON COUNTY
ST MARYS RIVER
121
119
(Joins sheet 86)
(Joins sheet 88)
3
4
5
6
7
8
9
10
15
16
17
18
1 Mile
5 000 Feet
0
¼
½
¾
1 000
2 000
3 000
4 000
5 000
Scale 1:15 840

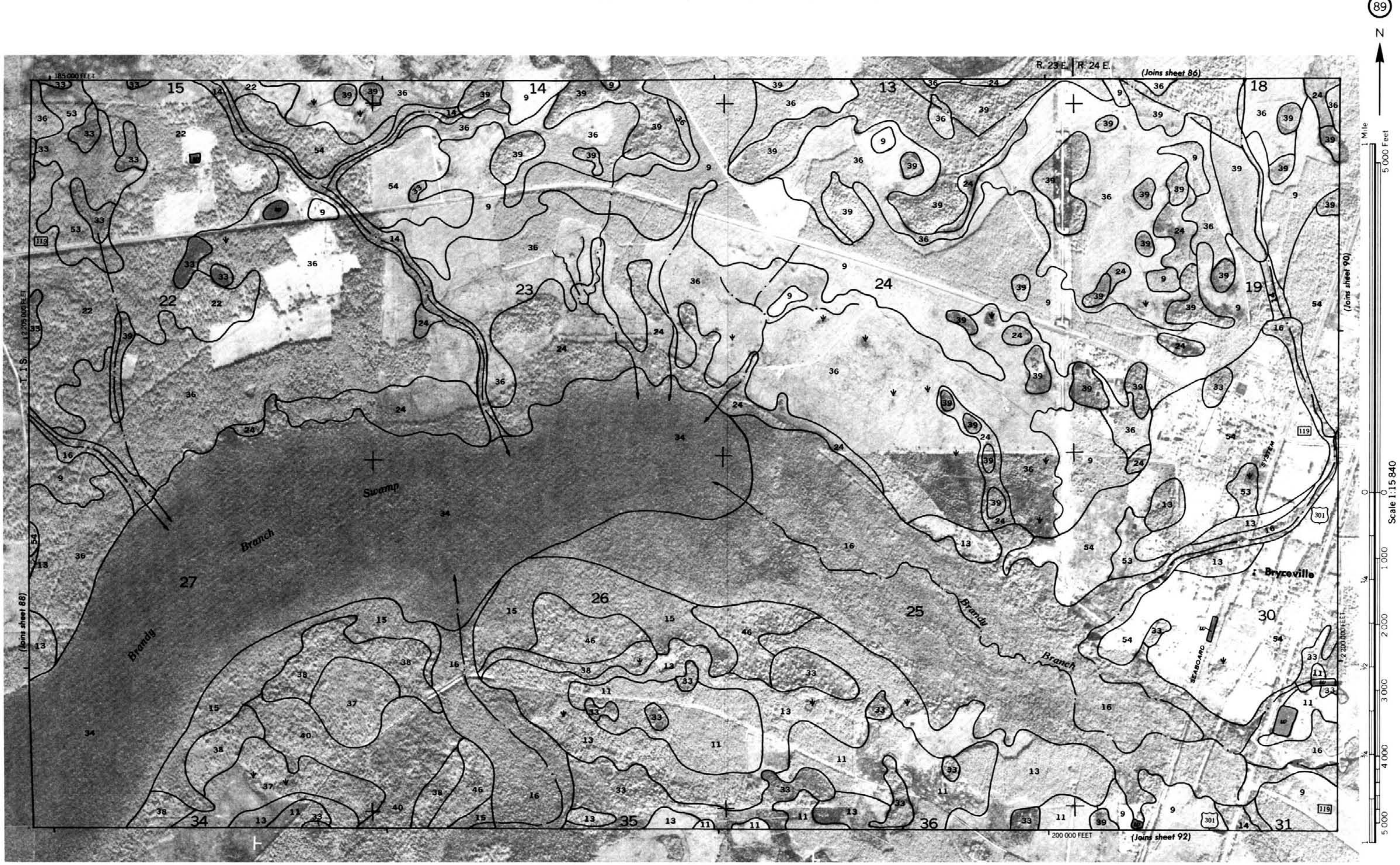

N
1 Mile
5 000 Feet
0
Scale 1:15 840
1 000
2 000
3 000
4 000
5 000
¼
½
¾
(Joins sheet 82)
(Joins sheet 85)
(Joins sheet 87)
(Joins sheet 89)
R. 23 E. | R. 24 E.
T. 1 S.
200 000 FEET
220 000 FEET
185 000 FEET
2 210 000 FEET
1
2
3
6
7
10
11
12
13
14
15
18

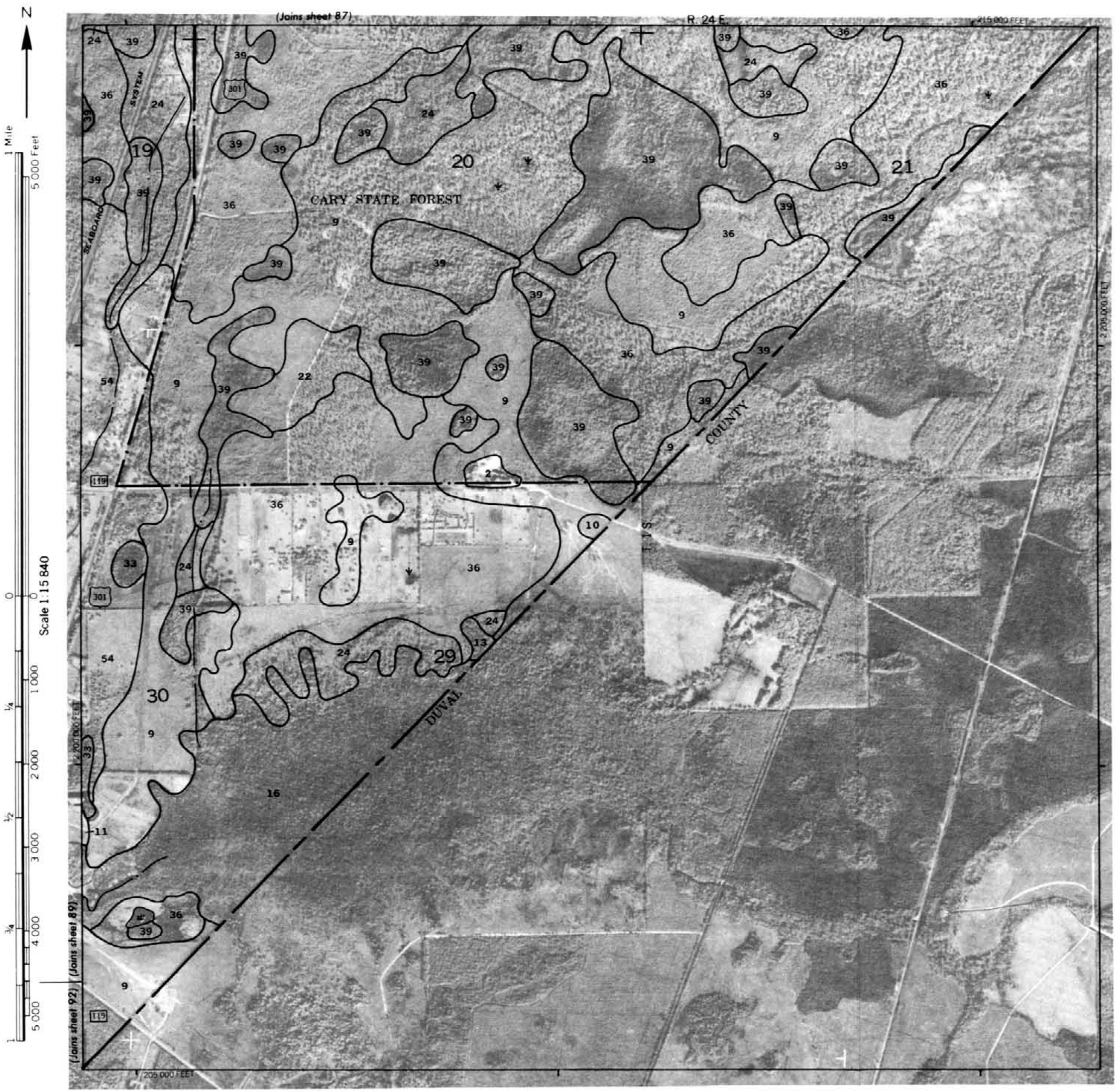

N
205 000 FEET
2 220 000 FEET
R. 24 E.
(Joins sheet 83)
(Joins inset A, sheet 94)
(Joins sheet 90)
(Joins sheet 86)
T. 1 S.
Verdie
Ingle
SEABOARD SYSTEM
301
CARY STATE FOREST
DUVAL COUNTY
210 000 FEET
220 000 FEET
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1000
2000
3000
4000
5000
2
3
4
5
6
7
8
9
10
11
13
14
15
16
17
18
20
21
24
27
33
36
39
51
53
54

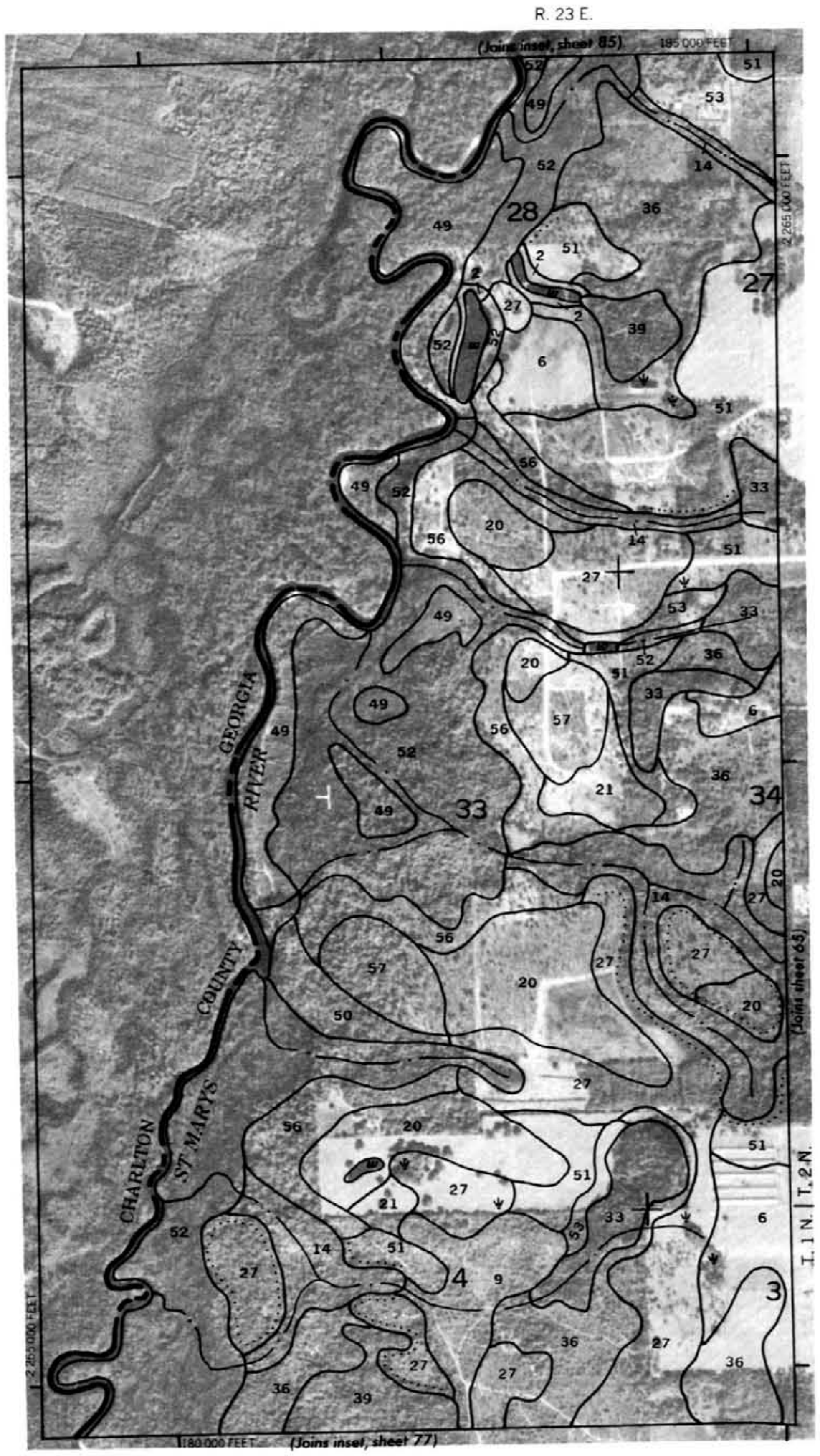
N
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
0
1


R. 26 E.
270 000 FEET
2 235 000 FEET
(Joins sheet 8)
T. 4 N.
CAMDEN COUNTY
GEORGIA
ST. MARYS RIVER
2 230 000 FEET
265 000 FEET
(Joins sheet 14)
43
32
51
16
15
13
11
7
35
37

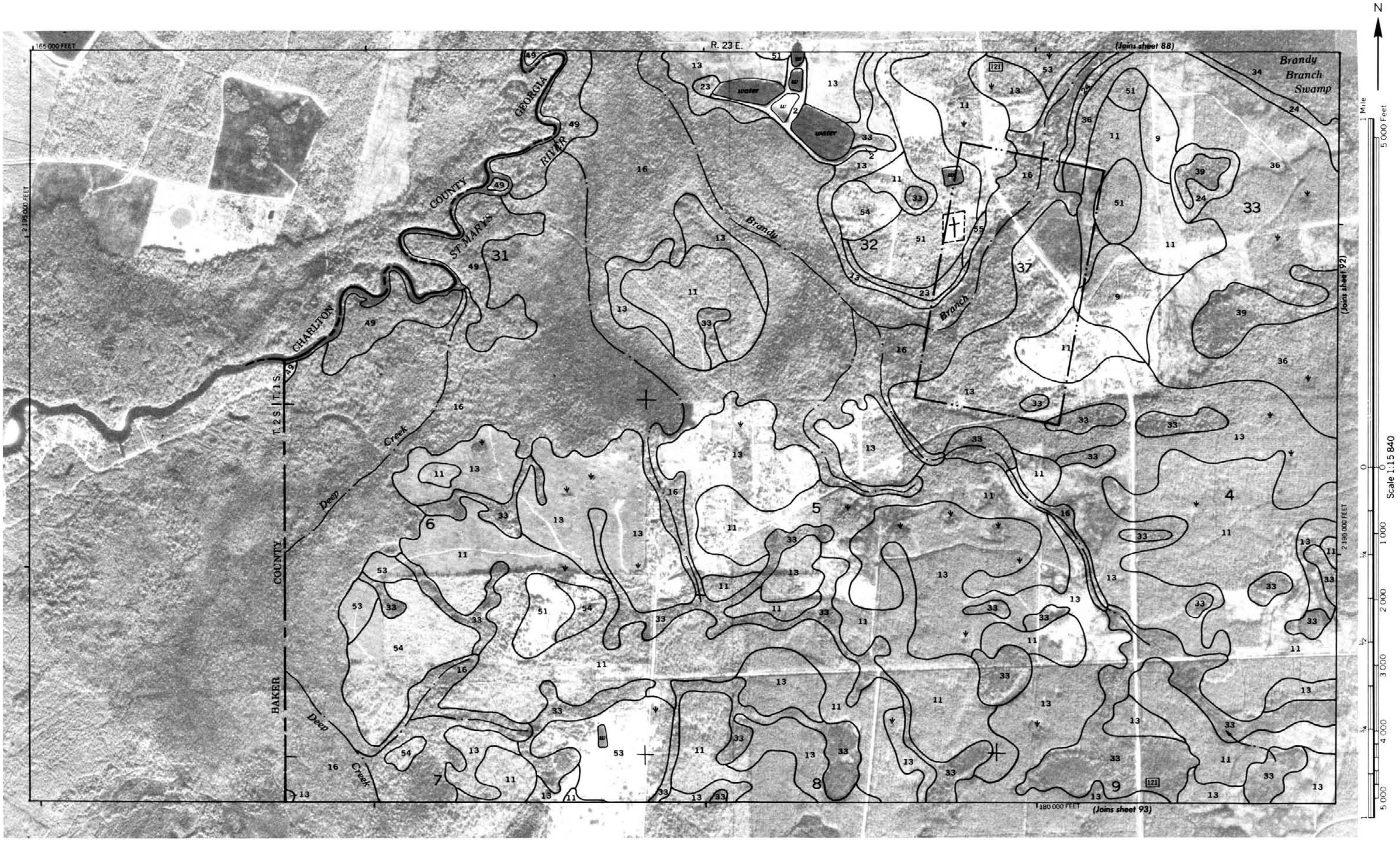

(Joins sheet 85)
R. 23 E.
180 000 FEET
119
121
ST. MARYS RIVER
CHARLTON COUNTY
GEORGIA
2 205 000 FEET
2 200 000 FEET
T. 1 S.
(Joins sheet 89)
(Joins sheet 91)
175 000 FEET
Brandy Branch
Brandy Branch Swamp
16
17
18
19
20
21
28
29
30
34


89
N
R. 23 E. | R. 24 E.
(Joins sheet 86)
(Joins sheet 90)
(Joins sheet 88)
(Joins sheet 92)
185 000 FEET
200 000 FEET
2 205 000 FEET
2 200 000 FEET
T. 1 S.
Brandy Branch Swamp
Brandy Branch
Bryceville
SEABOARD
SYSTEM
119
301
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1 000
2 000
3 000
4 000
5 000

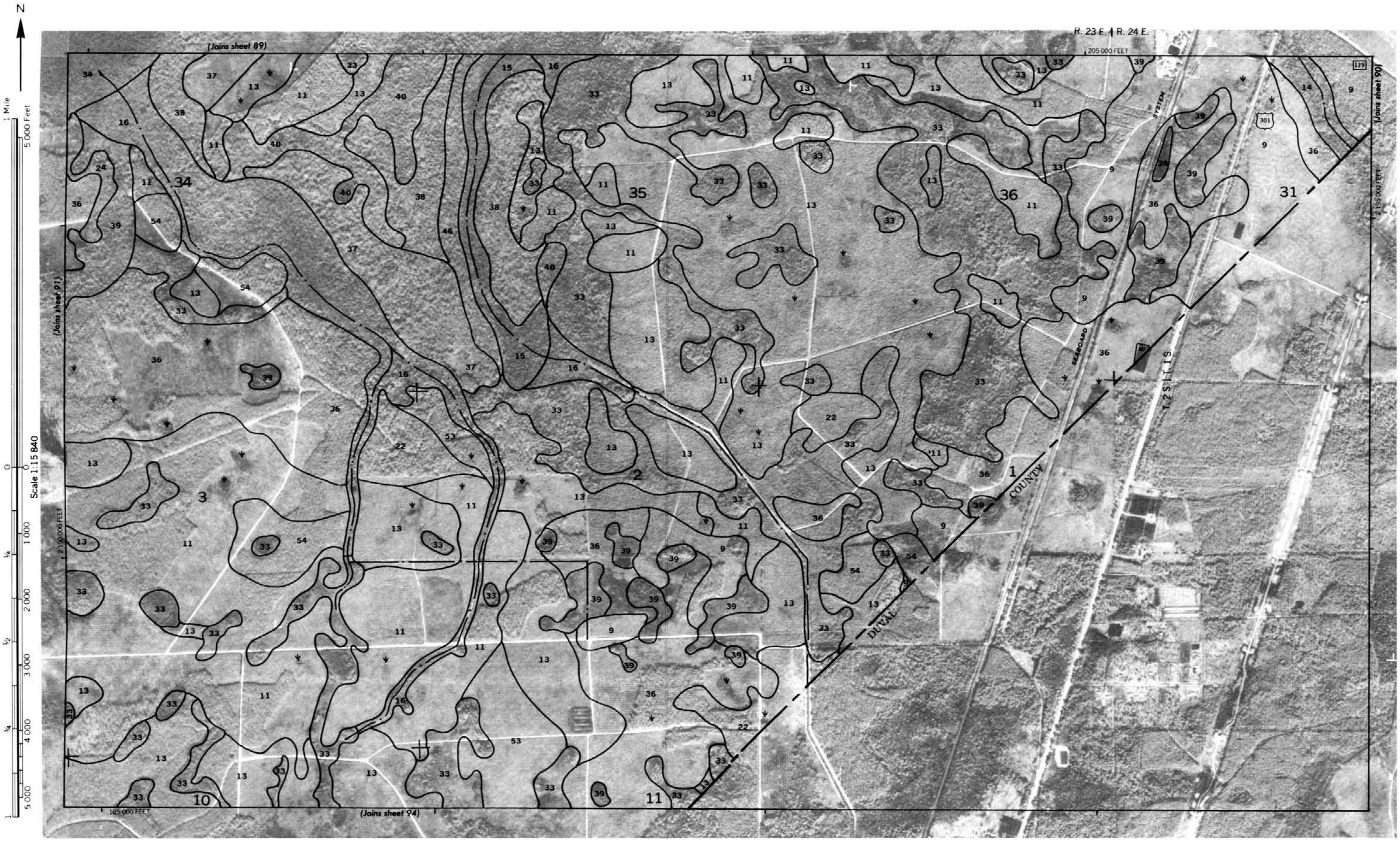

N
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
0
1 000
2 000
3 000
4 000
5 000
(Joins sheet 87)
R. 24 E.
215 000 FEET
SEABOARD SYSTEM
301
119
CARY STATE FOREST
19
20
21
29
30
DUVAL COUNTY
2 209 000 FEET
2 201 000 FEET
(Joins sheet 89)
(Joins sheet 92)
205 000 FEET

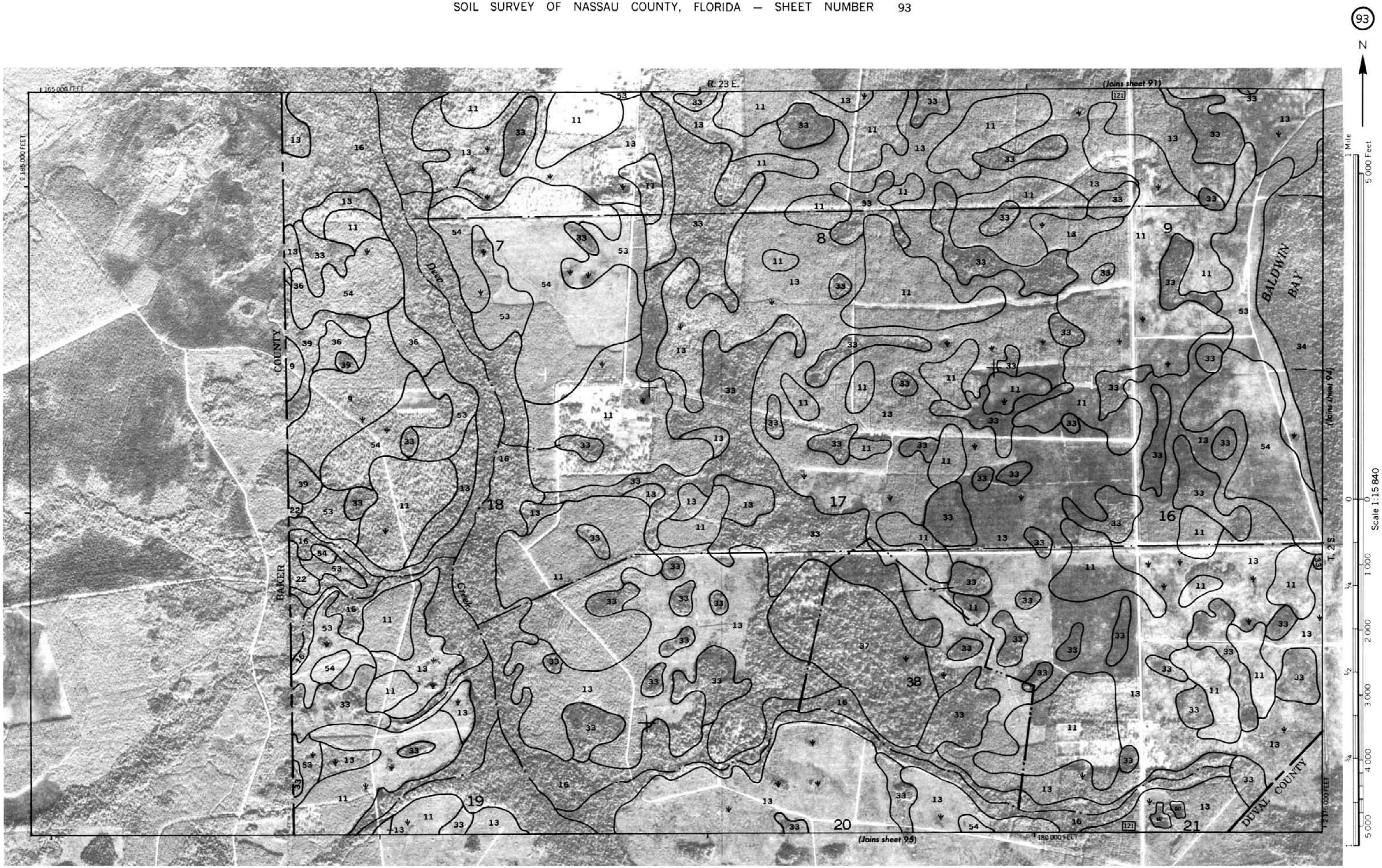

R. 23 E.
(Joins inset, sheet 85)
185 000 FEET
2 265 000 FEET
28
27
33
34
4
3
GEORGIA
CHARLTON COUNTY
ST. MARYS RIVER
T. 1 N.
T. 2 N.
180 000 FEET
(Joins inset, sheet 77)

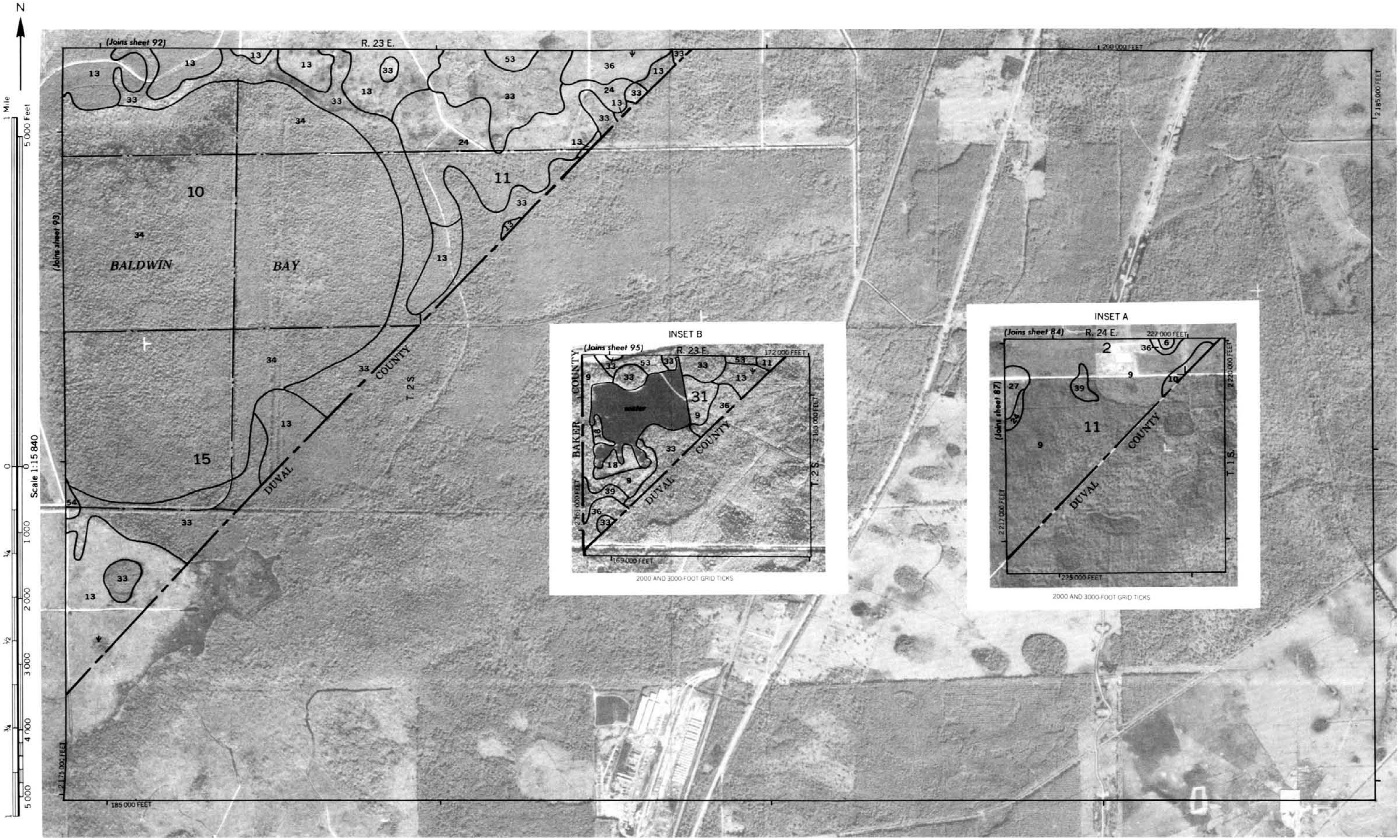
SOIL SURVEY OF NASSAU COUNTY, FLORIDA — SHEET NUMBER 91

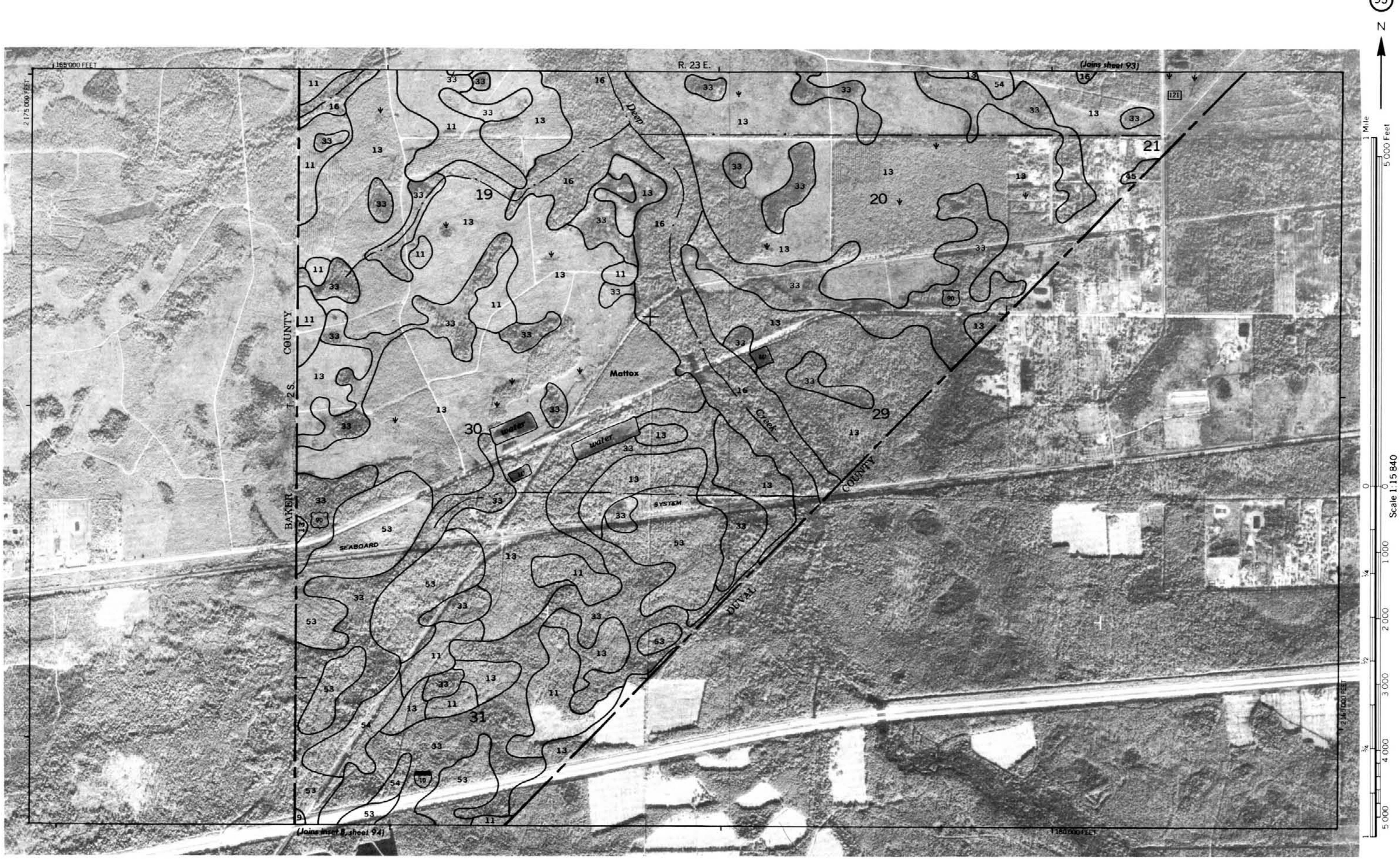

N
165 000 FEET
R. 23 E.
(Joins sheet 88)
(Joins sheet 92)
(Joins sheet 93)
180 000 FEET
2 195 000 FEET
2 190 000 FEET
Brandy Branch Swamp
GEORGIA
CHARLTON COUNTY
ST MARYS RIVER
Brandy Branch
Deep Creek
BAKER COUNTY
T. 2 S. | T. 1 S.
121
water
w
31
32
37
33
5
6
4
7
8
9
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
0
1 000
2 000
3 000
4 000
5 000
2
9
11
13
16
23
24
33
34
36
39
49
51
53
54
55

SOIL SURVEY OF NASSAU COUNTY, FLORIDA — SHEET NUMBER 92


N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 89)
(Joins sheet 91)
(Joins sheet 90)
(Joins sheet 94)
R. 23 E. | R. 24 E.
205 000 FEET
185 000 FEET
2 190 000 FEET
2 195 000 FEET
T. 2 S. | T. 1 S.
SEABOARD
SYSTEM
301
119
DUVAL
COUNTY


93
N
R. 23 E.
(Joins sheet 91)
(Joins sheet 94)
(Joins sheet 95)
T. 2 S.
165 000 FEET
180 000 FEET
2 185 000 FEET
2 175 000 FEET
BAKER COUNTY
DUVAL COUNTY
BALDWIN BAY
Deep Creek
121
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1 000
2 000
3 000
4 000
5 000
7
8
9
16
17
18
19
20
21


N
1 Mile
5 000 Feet
0
1/4
1/2
3/4
1
0
1 000
2 000
3 000
4 000
5 000
Scale 1:15 840
(Joins sheet 92)
R. 23 E.
200 000 FEET
2 185 000 FEET
(Joins sheet 93)
BALDWIN
BAY
DUVAL
COUNTY
T. 2 S.
185 000 FEET
2 175 000 FEET
10
11
13
15
24
33
34
36
53
54
INSET B
(Joins sheet 95)
R. 23 E.
172 000 FEET
BAKER
COUNTY
DUVAL
COUNTY
water
9
11
13
18
31
33
36
39
53
T. 2 S.
2 163 000 FEET
2 161 000 FEET
169 000 FEET
2000 AND 3000-FOOT GRID TICKS
INSET A
(Joins sheet 84)
R. 24 E.
227 000 FEET
(Joins sheet 87)
2
6
9
10
11
24
27
36
39
DUVAL
COUNTY
T. 1 S.
2 220 000 FEET
2 217 000 FEET
225 000 FEET
2000 AND 3000-FOOT GRID TICKS


N
165 000 FEET
2 175 000 FEET
R. 23 E.
(Joins sheet 93)
(Joins inset B, sheet 94)
180 000 FEET
2 165 000 FEET
BAKER COUNTY
T. 2 S.
DUVAL COUNTY
Deep Creek
Mattox
SEABOARD
SYSTEM
water
19
20
21
29
30
31
90
121
10
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
1 000
2 000
3 000
4 000
5 000